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Edward H. McLachlin

July 17, 1894.

NAUTICAL TABLES.

Sanctioned for Use in the Royal Navy

NAUTICAL TABLES

DESIGNED FOR

THE USE OF BRITISH SEAMEN

BY THE

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AND PROFESSOR OF MATHEMATICS AT THE ROYAL NAVAL COLLEGE, PORTSMOUTH

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NEW EDITION

Revised, Rearranged, and Enlarged

LONDON
KEGAN PAUL, TRENCH, TRÜBNER, & CO., LTD.
1892

KG 211

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PREFACE.

OWING to the changes which have been made from time to time, since this work was first stereotyped, the order of the Tables had become confused and the paging defective. The opportunity, therefore, of a new revision has been taken to rearrange the whole book.

The Tables relating to similar subjects have been brought together, repaged and consecutively numbered. Some, such as the Logistic Logarithms, the Log. Difference, the Greenwich Date of Sun and Moon, have been omitted, as belonging to methods no longer in common practice; others, such as those for Acceleration and Retardation, have been rearranged; the Table showing the Hour Angle on the Prime Vertical has been extended, and a companion Table, giving the Altitude of a Body in the same position, has been added. The Half-Log. Haversines have been recalculated and corrected. Several new Tables have been added for the convenience of practical navigators and for purposes of instruction and reference; amongst them are Mr. A. C. Johnson's valuable Table for correcting Longitude by Chronometer for an Error in Latitude and for Computing Position by Double Chronometer rule (inserted by his kind permission); Tables for converting Departure into Diff. Long., Arc into Time and their Contraries; for showing Position by Two Bearings and Distance run; a Table of Natural Sines, Tangents, Secants and their Complements; Tables of Secondary Meridians, Corresponding Thermometers and Measures, Astronomical Data, Abbreviations in Admiralty Charts and Symbols used in Astronomy and Nautical Surveying; and for ready reference the following Tables have been given from the Nautical Almanac—the Sun's Declination and the Equation of Time for Four Years, the Mean Places of 100 Principal Stars, and the Correction for Second Differences of Lunar Distances. The Table of Sea-Board Places, which was somewhat out of date, has been withdrawn; and for it has been substituted an abbreviated form of the very accurate Table drawn up for the use of the United States Navy, adapted to the requirements

of our own Navy and corrected from the most recent authorities by Staff-Commander W. R. Martin, R.N., to whom I am indebted for invaluable assistance and advice in the whole work of revision and rearrangement. Captain Martin, whose book on Navigation * has been recently adopted by the Admiralty as the text-book in the Royal Navy, has also entirely rewritten "The Explanation of the Tables," with the object of enabling Naval Officers to understand their construction as well as their use.

My thanks are also due to Mr. A. C. Johnson, R.N., for the use of his Table; and to Mr. E. H. Hebden, who calculated the Correction Tables of the Sun's Altitude (involving Dip, &c.), of the Auxiliary Angle for Thermometer and Barometer, and of the Mean Refraction, which were added some years ago, for a recalculation of the last mentioned Table and for a slight, though useful, expansion of Mr. Johnson's Table.

H. T. INMAN, M.A.

WOOLSTON RECTORY, BLETCHLEY,
February 16, 1888.

Note.—In the present edition the following new Tables have been added:—

Reduction to the Meridian, Parts I. and II.
Lengths of Degrees of Latitude and Longitude.
True bearing of the Pole Star.
Distance Table between principal ports.

March 1891.

* A Treatise on Navigation and Nautical Astronomy, published by Messrs. Longmans, Green, & Co., London.

CONTENTS.

		PAGE
EXPLANATION OF THE TABLES		ix
TABLE		
1.	Points of Compass, &c.	1
2.	Length of a Degree of Longitude in different Latitudes	1
3.	Traverse Table	2
4.	Converting Departure into Difference of Longitude	39
5.	Converting Difference of Longitude into Departure	40
6.	Correction of Middle Latitude	41
7.	Meridional Parts	42
8.	Distance of Objects seen at Sea	51
9.	Dip of Sea Horizon	51
10.	Dip of Shore Horizon	51
11.	Position by two Bearings and Distance run	52
12.	Refraction or Correction of a Star's apparent Altitude	53
13.	Correction of Mean Refraction	55
14.	Parallax of Sun in Altitude	55
15.	Symbols and Abbreviations used in Astronomy and Nautical Surveying	55
16.	Correction of Sun's apparent Altitude	56
17.	Correction of Sun's Altitude (involving Dip, Refraction, &c.)	58
18.	Sun's Declination for Four Years	59
19.	Mean Places of 100 Stars	61
20.	Parallax in Altitude for Planets	62
20a.	Reduction to the Meridian	62*
20b.	Length of a Degree in Latitude and Longitude	65*
20c.	True bearing of the Pole Star	65*
21.	Correction for Pole Star	63
22.	Augmentation of Moon's Horizontal Semi-diameter	66
23.	Correction in finding Moon's Meridian Passage	66
24.	Correction of Moon's Altitude and the Auxiliary Angle A	67
25.	For correcting Longitude by Chronometer for an error in Latitude, and for Computing Position by Double Chronometer Rule	110
26.	Conversion of Arc into Time and the Contrary	112
27.	Hour Angle of the Sun on the Prime Vertical	113
28.	Altitude when the Sun is on the Prime Vertical	114
29.	Equation of Time for Four Years	116
30.	Acceleration	118
31.	Retardation	118
32.	Log. Sines, Tangents, Secants, &c.	119
33.	Half-Log. Haversines	305
34.	Log. Haversines	335

TABLE		PAGE
35.	Logarithms of Numbers	394
36.	Natural Versines	423
37.	Bearing Amplitude and Time Amplitude at the Rising and Setting of the Sun	462
38.	Reduction of Horizontal Parallax and Latitude of Place for figure of Earth	466
39.	Reduction of Semi-diameter on account of Refraction	466
40.	Correction of A for Planet in clearing Distance	466
41.	Correction of Auxiliary Angle for Thermometer and Barometer	466
42.	Proportional Logarithms	467
43.	Correction for Second Differences of Lunar Distances	487
44.	Natural Sines, Tangents, Secants, &c.	488
45.	Corresponding Thermometric Scales	518
46.	Corresponding Measures	519
47.	Astronomical Data	519
48.	Abbreviations in Admiralty Charts	520
49.	Secondary Meridians	520
50.	Table of Positions	522
51.	Distance Table	549

EXPLANATION OF THE TABLES

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Points of Compass, &c.—This table shows for each quarter point of the compass the corresponding angle from the north or south point, the degrees on the compass card increasing from north and south to 90° at *both* east and west. Table 1, p. 1.

The course is usually estimated to the nearest quarter point in rough weather, and to the nearest degree under more favourable circumstances.

The quantity given under the heading "Log. Sine," being the Log. sine of the course, is useful for calculations in the sailings; when the Log. cosine is required, the Log. sine of the complement of the course should be looked out from this table.

Length of a Degree of Longitude in different Latitudes.—This table shows the distance corresponding to a degree of longitude in every latitude. Table 2, p. 1.

Thus a vessel steering east or west true for 60 miles on the equator, changes her longitude by one degree; on steering the same courses for the same distance in lat. 60°, the longitude is changed by two degrees.

The distances are expressed in both statute and nautical miles, the former containing 5280 feet, and the latter (being the sixtieth part of a degree of latitude) varying from 6046 feet at the equator to 6108 feet at the pole.

Traverse Table.—The traverse table affords by inspection the solution of any right-angled plane triangle, or *small* right-angled spherical triangle; the numbers given in the upper *horizontal* column headed "Distance" represent the number of units in the hypothenuse; the acute angles are given in the right and left hand *vertical* columns, while the numbers of units in the sides are given in the columns headed "Diff. lat." and "Dep." Table 3, p. 2.

Thus if the length of the hypothenuse is known to be 100 inches and one acute angle is 30°, then by inspection it is seen that the other acute angle is 60° and the sides 86·6 inches and 50 inches, the longer side being of course opposite to the greater angle.

As almost all practical problems in navigation resolve themselves into the solution of right-angled plane triangles, the results may be rapidly obtained by inspection from this table, where the names given to the sides are those employed in the solution of cases of plane sailing. As illustrations of the almost innumerable applications of this useful table the reader is referred to "Navigation," pp. 58, 65, 184.*

For the solution of those cases in which the course is estimated in *points*, the table is arranged on the upper part of each page calculated to each quarter of a point; when the course is given in *degrees*, the table on the lower part of each page, calculated to each degree, should be employed.

The limit of the table (296 units in the hypothenuse) may be readily extended by taking a fractional part of the given element; thus if one side of a plane triangle is known to be 600 miles, and one of the acute angles 40°, the remaining sides of a similar triangle having a side equal to 150 miles would be looked for, and the results multiplied by 4.

Tables 4 and 5, pp. 39, 40.

Converting Departure into Difference of Longitude and vice versâ.—These tables are useful for converting departure into diff. long., and *vice versâ*, by inspection.

They are calculated from the well-known formulæ, dep. = diff. long. × cos. lat., and diff. long. = dep. × sec. lat. (see "Navigation," p. 63).

Table 6, p. 41.

Correction of Middle Latitude.—This table gives the number of degrees and minutes to be added to the half sum of the two latitudes in mid. lat. sailing, in order to obtain the true mid. lat. (see "Navigation," p. 62, footnote).

The table is entered with the half sum of the lats. at the side, and the diff. lat. at top; the correction is always additive to the half sum. The table is constructed by equating the values of the course as obtained by mid. lat. and Mercator sailings,

$$\text{thus } \frac{\text{diff. long.} \times \cos.\text{ (true) mid. lat.}}{\text{diff. lat.}} = \frac{\text{diff. long.}}{\text{Mer. diff. lat.}}$$

and $\therefore$ cos. true mid. lat. $= \frac{\text{diff. lat.}}{\text{Mer. diff. lat.}}$, from which the true mid. lat., and hence the correction is found.

Table 7, p. 42.

Meridional Parts.—This table gives the proportional increase of each mile of latitude shown on a Mercator's chart above that corresponding to it on the globe, necessitated by the meridians on the chart having been drawn parallel to one another and equidistant in all latitudes, such increased length bearing the same ratio to the true length that the increased separation of the meridians on the chart bears to their true separation on the globe (see "Navigation," p. 26).

The table is constructed on the assumption of the earth being a *sphere*,

* The "Navigation" referred to throughout this "Explanation" is the Text-book officially adopted in the Royal Navy (published by Messrs. Longmans), which has been specially adapted to Inman's Tables.

whose radius is 3437·74677 nautical miles, and the formula employed is lat. on chart (in minutes) = log. cot. $\frac{1}{2}$ colat. × 2·302585 × 3437·74677.

This formula is obtained by integrating the expression (derived from spherical trigonometry)—

$$\text{diff. lat. on chart} = \frac{\text{diff. lat. on sphere}}{\text{cos. lat.}},$$

this by integration becomes:—lat. on chart = Napierian log. cot. $\frac{1}{2}$ colat., which is converted into common logarithms by multiplying by 2·302585, and into minutes of arc by multiplying again by the radius 3437·74677. From the table it is seen that at the equator one mile of latitude is represented on a Mercator's chart by a line of equal length to that on the globe, while in lat. 60° the length on the chart (that is, the difference between the Mer. parts for 60° and 60° 1′), is double of that on the globe.

Delambre, in the *Conn. des Temps* for 1805, showed that a table of meridional parts for a spheroid of small eccentricity is of the same form (practically) as that for a sphere, the table being entered with the geocentric or reduced latitude instead of the geographical latitude (see explanation of Table 38).

Distance of Objects seen at Sea.—This table gives the distance of the visible horizon from an observer, expressed in nautical miles, on the supposition that the effect of refraction will be to increase the distance of visibility by $\frac{8}{100}$ths of itself. Table 8, p. 51.

It is calculated on the assumption of the earth being a sphere from the formula $t^2 = h \times (d \times h)$, Euc. iii. 36, where t is the required distance in feet, h is the height of the observer in feet above the surface of the earth, and d is the diameter of the earth (assumed to be 41,905,000 feet). The value of t thus determined is increased by $\frac{8}{100}$ths of itself, and expressed in nautical miles, each equal to 6079 feet.

Example.—From what distance will a hill 500 feet high be visible to an observer 20 feet above the sea?

To an observer on the summit of the hill the horizon would be 19·91 miles distant, and to the present observer it is 5·15 miles distant, hence two such observers facing one another would just see each other at a distance of 19·91 + 5·15 = 25·06 miles, which is therefore the distance of visibility of the hill.

As the effect of refraction on low altitudes is very uncertain this table only gives approximate results.

Dip of Sea Horizon.—This table is calculated from the formula—Dip in minutes = ·984 $\sqrt{h}$, where h is the height of the observer above the surface of the earth, expressed in feet (see "Navigation," p. 122). The value thus obtained is that of the *apparent* dip, or the *true* dip diminished by refraction, which is considered to reduce its value by about $\frac{3}{40}$ths of itself. Table 9, p. 51.

As this latter correction depends upon the relative temperature of the sea-surface, and that of the air above it, the dip can only be considered

as known to the nearest minute. The correction taken from this table is subtractive from the observed altitude.

Table 10, p. 51. **Dip of Shore Horizon.**—When an observation is made of the altitude of a mountain, or heavenly body seen over the land, the dip to be subtracted from the observed altitude is the angle contained between a horizontal plane passing through the observer's eye and a line from his eye to the water-line of the shore, as actually seen, that is, raised by refraction. The table is calculated from the formula given in the U. S. official edition of Bowditch's Tables—

$$\text{Dip in minutes} = \tfrac{3}{7}\, d \times 0{\cdot}56514 \times \frac{h}{d} \text{ (see Chauvenet's Astronomy)},$$

where d is the distance of the shore in nautical miles, and h is the height of the observer's eye in feet.

Table 11, p. 52. **Position by two Bearings and Distance run.**—This table affords a ready means of determining a ship's position by means of two bearings of a fixed object whose lat. and long. are known, and also the distance run between the bearings (see "Navigation," p. 49).

The table is calculated from the triangle formed by the object and the two positions of the ship, the angles of which triangle are all known and also one side.

Example.—A light bears N.E. ½ E., and on running 20 miles East it bears North, find the distance off when the second bearing was taken. Entering the table with 3½ points (the diff. between N.E. ½ E. and East) at the top, and 8 points (the diff. between North and East) at the side, it is seen that $20 \times {\cdot}82$ is the required distance.

Table 12, p. 53. **Refraction or Correction of a Star's apparent Altitude.**—This table shows the increase in apparent altitude of *any* heavenly body caused by the transmission of a ray of light from it through the atmosphere.

It is calculated from the formula proposed by Dr. Young in 1819—

$$\cdot0002825 = v\,\frac{r}{s} + (2{\cdot}47 + {\cdot}5\ v^2)\frac{r^2}{s^2} + 3000\ v\frac{r^3}{s^3} + 3600\ (1{\cdot}235 + {\cdot}25\ v^2)\,\frac{r^4}{s^4}$$

where r is the refraction, v the sine of the altitude, and s the cosine; the barometer at time of observation reading 30·00 ins., the thermometer 50° F., and the observer being supposed to be on the surface of the earth. This correction is the only one required to be applied to an altitude of a star, and is subtractive. For greater accuracy in such observations as rating chronometers by shore observations (absolute altitudes) this table requires correction from Table 13.

Table 13, p. 55. **Correction of Mean Refraction.**—The table of Refraction (Table 12) has been computed for a mean state of density of the atmosphere, when the pressure is represented by a barometric reading of 30 ins., and the temperature is 50° F.

A change in the density will produce a change in the amount of refraction, greater density occasioning greater refraction and *vice versâ*.

Such change of density is indicated by either (1) a change in the pressure, or (2) in temperature, or (3) in both combined.

(1.) When the barometer reading is greater or less than 30 ins., the density is greater or less, and therefore the refraction greater or less than that given in the table.

(2.) A rise of temperature above 50° F. will occasion a decrease of density of the air, and hence a decrease of refraction, while a fall below 50° F. will produce similar but opposite effects.

From physical experiments it is known that a given volume of air, on being raised from a temperature of 50° F. to that of $t°$, will expand in the proportion of $1 : 1 + \cdot00208\ (t° - 50°)$; hence, by Boyle's law, its density, and therefore the refraction, will be diminished.

The formulæ from which the table is calculated are those proposed by Dr. Young in 1819.

Parallax of Sun in Altitude.—This table is constructed from the formula—par. in alt. (in seconds) = hor. par. (in seconds) × cos. app. alt. (see "Navigation," p. 127). The horizontal parallax or angle at the centre of the sun subtended by the *equatorial* radius of the earth being assumed equal to 8″·8, and the very small correction for the spheroidal form being neglected in navigation. Table 14, p. 55.

Symbols and Abbreviations used in Astronomy and Nautical Surveying.—This table is an explanation of some of the principal symbols and abbreviations used in astronomy and nautical surveying. Table 15, p. 55.

Correction of Sun's apparent Altitude.—This table combines in one the corrections applicable to an observed altitude of a limb of the sun, for (1) Refraction (Table 12), and (2) Parallax in Altitude (Table 14). Table 16, p. 56.

As the former in the case of the sun always exceeds the latter, the combined correction is subtractive from the apparent altitude. The semi-diameter (which is the true angle subtended by the semi-diameter of the sun at the *centre* of the earth) should be applied *after* this correction.

Correction of Sun's Altitude (involving Dip, Refraction, &c.).—This table embodies in one the various corrections applicable to an observed altitude of the sun's upper or lower limbs, including Dip, Refraction, Parallax and Semi-diameter, the error involved by assuming the sun's semi-diameter always equal to 16′, being allowed for in the auxiliary table at the foot. Table 17, p. 58.

In a rough sea, where the correction for dip is uncertain, this table may be used instead of those more complete tables where the corrections are dealt with separately.

Sun's Declination for Four Years.—In the case of the sun the values of the declination and equation of time almost exactly repeat themselves at intervals of four years, that is to say, for any particular day in 1890, 1891, 1893, &c., these elements will have nearly the same value as on the corresponding day in 1886, 1887, 1889, &c.; hence within the limits of error mentioned in the footnotes on pp. 59, 116, this table and Table 29 may be used for approximate purposes in place of the Nautical Almanac. Table 18, p. 59.

Table 19, p. 61. **Mean Places of 100 Stars.**—This table gives the mean positions on January 1, 1888, of 100 stars from the 1st to the 3rd magnitude inclusive, useful for purposes of navigation; the signs + and − written against their declinations indicate North and South respectively.

From the numbers given in the columns of "Annual Variation" the mean positions for any other year can be found.

These *mean* positions may for most practical purposes be considered identical with their *true* positions on *any* day in the year.

Table 20, p. 62. **Parallax in Altitude for Planets.**—This table is derived from the formula—par. in alt. (in seconds) = hor. par. (in seconds) × cos. app. alt. (see "Navigation," p. 127). The horizontal parallax with which this table is entered, is that given in the Nautical Almanac in the Planetary Ephemerides at Transit, and represents the angle at the centre of the planet subtended by the *equatorial* radius of the earth, the small correction for the spheroidal form being neglected in navigation. This correction is additive to the apparent altitude.

Table 20a, p. 62a. **Reduction to the Meridian.**—These tables are useful for the determination of the latitude by the ex-meridian problem; part 1 or the value of $\frac{2 \sin^2 . \frac{1}{2} h}{\text{sin. } 1''}$ was originally calculated by Delambre in 1814, part 2 or the value of $\frac{2 \sin.^4 \frac{1}{2} h}{\text{sin. } 1''}$ was calculated by Schumacher in 1816 (see "Navigation," p. 224).

Table 20b, p. 65b. **Length of a Degree in Lat. and Long.**—The length of each alternate degree of latitude and longitude is given in this table both in statute and nautical miles upon the assumption that the figure of the earth is that of an oblate spheriod whose compression $= \frac{1}{299}$.

Table 20c, p. 65c. **True Bearing of the Pole Star.**—The true bearing of the pole star for each half-hour of sidereal time given in the table is calculated from the formula, sin. bearing $= p$ sin. h sec. lat. (see "Navigation," p. 277, footnote). It is useful in northern latitudes for determining either the deviation of the compass or total error at night.

Table 21, p. 63. **Correction for Pole Star.**—This table gives the differences between the true altitudes of the pole star and that of the pole for three assumed latitudes, and for each 10^m of the sidereal time or R.A. of Mer.; the results are accurately given for the *commencement* of two years, separated by an interval of ten years, the correction for intermediate sidereal times, latitudes, and years being obtained by interpolation. The table is derived from calculating the true zenith distances corresponding to the three assumed colatitudes, and for assumed hour angles at intervals of 10^m apart; the differences between the zenith distances and the colatitudes are the corrections given.

Table 22, p. 63. **Augmentation of Moon's Horizontal Semi-Diameter.**—The augmentation of the moon's semi-diameter is the excess of the angle subtended by the semi-diameter of the moon at the *surface* of the earth, above the same angle as measured at its centre; this excess is caused by the fact of the moon being nearer to an observer at *any* altitude than when it is on his horizon, the difference in distance when in the zenith being a radius of the earth (see "Navigation," p. 127).

The table is calculated from the formula—

$$\text{Aug. in seconds} = AR^2 \cos z' + \tfrac{1}{2}A^2R^3 + \tfrac{1}{2}A^2R^3 \cos.^2 z',$$

where R = moon's horizontal semi-diameter, z' = apparent zenith distance of moon's centre, and A = 3·6697 × sin. 1″ (see Loomis' Astronomy). This is derived from the equation Aug. = 2R cosec. $(z'-p)$ cos. $(z'-\frac{1}{2}p)$ sin. $\frac{1}{2}p$ (see "Navigation," p. 128), by substituting for p its value expressed in terms of the *horizontal* parallax, and again for this latter its equivalent in terms of the semi-diameter, assuming that semi : hor. par. :: 1 : 3·6697.

Correction in finding Moon's Meridian Passage.—The interval between the meridian passage of the sun (noon), and that of the moon (upper transit), is *less* for places in east longitude, and *greater* for those in west longitude, than that given in the Nautical Almanac for Greenwich (see "Navigation," p. 181). Table 23, p. 66.

The table is entered with the difference between two consecutive upper meridian passages of the moon given in the Nautical Almanac at the top, and the longitude at the side, the correction being given in minutes. In west longitude use the meridian passage of the given day and day after, and in east longitude those of the given day and day before.

Correction of Moon's Altitude and the Auxiliary Angle A.—This table combines in one the corrections applicable to an apparent altitude of the moon's centre for (1) Refraction, and (2) Parallax in altitude. Table 24, p. 67.

As the latter in the case of the moon always exceeds the former, the combined correction is additive.

This table is calculated for the *centre* of the moon, and it should be entered with the apparent altitude of the limb observed, increased by the *augmented* semi-diameter (Table 22).

The refraction is taken from Table 12, and the parallax in altitude deduced from the same formula as in Table 14, but calculated for values of the horizontal parallax varying from 54′ to 61′. The interpolation for seconds of horizontal parallax given on the right-hand vertical column is calculated for a mean horizontal parallax of 57′ 30″, and for a mean altitude of those given on each page.

Should the horizontal parallax lie between 53′ and 54′, then take the correction out for 54′, and subtract the parts for the seconds which the horizontal parallax is below 54′. Thus, suppose the horizontal parallax is 53′ 57″, and the moon's apparent altitude is 18° 16′; then the correction corresponding to 54′ of horizontal parallax and the altitude 18° 16′ is 48′ 23″, and the parts for 3″ at the right-hand side of the page is 3″: consequently the correction required is 48′ 20″.

Note.—For the description of that part of the table relating to the "Auxiliary Angle A," see description of Table 40.

For Correcting Longitude by Chronometer for an Error in Latitude, and for Computing Position by Double Chronometer Rule.—This table (inserted by kind permission of the author, Mr. A. C. Johnson, R.N.) is useful (1) for correcting the longitude for an error in the DR. lat. Table 25, pp. 110, 111

employed in calculating it, and (2) for working double altitudes by the method explained in "Navigation," p. 317. It gives in minutes of arc the value of cot. azimuth × secant latitude for each degree of bearing and latitude as far as lat. 60°; thus in the example given in "Navigation," p. 237, on entering the table with bearing 54° (known from the Azimuth tables), and latitude 51°, the correction of longitude for an error of one mile in latitude is seen to be 1'·15, agreeing practically with that found by calculation. The mode of applying such correction will be seen from the footnote on p. 305 of "Navigation."

The use of this table in working double altitudes is shown on p. 320 of "Navigation."

Table 2C, p. 112. **Conversion of Arc into Time and the Contrary.**—This table is useful for converting longitude into time and *vice versâ*.

In the first column are given degrees and minutes of arc, in the second column the corresponding hours and minutes of time; the other columns are continuations of the first and second columns respectively.

Tables 27 and 28, pp. 112–115. **Hour Angle and Altitude of the Sun on the Prime Vertical.**—The most advantageous time for taking an altitude of the sun, or any other heavenly body, from which apparent time is to be deduced, is when its true bearing is E. or W., and it is therefore on the prime vertical, provided its altitude above the horizon is then at least 6° or 7° (see "Navigation," p. 303). This time may be known by inspection from the table, entering it with the nearest degree to the declination at the top, and the nearest degree to the latitude at the side.

With any other heavenly body the time found is that before or after meridian passage.

Table 27 is calculated from the right-angled spherical triangle formed by the colatitude, polar distance, and zenith distance when on the prime vertical, assuming different values of the declination from 0° to 50°, and of the latitude from 0° to 70°. Table 28, giving the altitude at the instant of crossing the prime vertical, is useful for identifying stars when observing them for longitude, and is calculated by taking the complement of the zenith distance derived from the same spherical triangle.

Table 29, p. 118. **Equation of Time for Four Years.**—See description of Table 18.

Table 30, p. 118. **Acceleration.**—This table is similar to that given in the Nautical Almanac for converting intervals of mean solar time into equivalent intervals of sidereal time.

It is chiefly used in navigation for determining the right ascension of the mean sun at any instant, by increasing the sidereal time for the preceding Greenwich mean noon (taken from the Nautical Almanac), by the proportionate part of the increase for 24 mean solar hours ($3^m\ 56^s{\cdot}555$) due to the elapsed Greenwich time of observation. The table is constructed from the formula,

$$S = 1{\cdot}002738 \times M,$$

where M is any given interval of mean solar time, and S the corresponding interval of sidereal time (see "Navigation," p. 138).

Retardation.—This table is similar to that given in the Nautical Almanac for converting intervals of sidereal time into equivalent intervals of mean solar time; it forms the converse of Table 30, and is constructed from the formula, Table 31, p. 118.

$$M = \cdot 997269 \times S,$$

where S is any given interval of sidereal time, and M the corresponding interval of mean solar time (see "Navigation," p. 138).

Log. Sines, Tangents, Secants, &c.—This table gives the logarithms of the numbers in Table 44, increased by ten to avoid the occurrence of negative values, as many of the *natural* ratios are less than unity. Such *tabular* logarithms are distinguished by the letter L. Table 32, p. 119.

Log. Sine to Seconds.—Since the sines of small arcs change not only very rapidly, but also irregularly, the common method of proportioning for seconds is both troublesome and erroneous. On these accounts the L. sines of arcs as far as 50′ are given to seconds; the same numbers are the L. cosines of arcs between 90° and 89° 10′ to seconds. If the L. *tangent* of a small arc within the limits of the table be wanted, it may easily be found by subtracting the L. cosine from the L. sine, adding 10 to the index of the L. sine.

Log. Sines, &c.—An angle is put down in this table at the top and left hand side, if less than half a right angle; and at the bottom and right hand side, if greater than half a right angle; the angles included on the whole being from 0 to a right angle. Each angle is put down both in ° ′ ″ and in h. m. s., and the columns of L. sines, L. cosines, &c., are marked at the top or bottom; the titles at the top must be used when the angle is less than 45°, or 3^h, and at the bottom when greater than 45°, or 3^h.

If an angle be greater than 90°, or 6^h, take it from 180°, or 12^h, and find the L. sine, &c., for the remainder.

This table is useful in turning ° ′ ″ into h. m. s. and conversely. If an angle expressed in ° ′ ″ be greater than 90°, allow 6^h for 90°, and look for the excess above 90°. If an angle in time be greater than 6^h, allow 90° for 6^h, and look for the excess above 6^h.

Table of Prop. Parts.—A principal use of this table is to take out L. *sin.*, L. *cos*, &c., for seconds of arc. To do this, take out of the table of L. *sin.*, L. *cos.*, &c., the difference for 15″ of arc. Look for this *diff.* in the left marginal column of this Table of Prop. Parts, under 15; then the *diff.* for any odd seconds above the next less 15″, for which the L. *sin.*, L. *cos.*, &c., is given, will be found in the same horizontal line, and under the said odd seconds in the extreme heading in a line with 15. In using this table it must be particularly noticed that some of the last figures, under the heading 15, may be considered as decimal fractions, in which case, the same number of decimal fractions must be supposed in the number taken out. Let the L. *sin.* of 12° 33′ 23″ be required. The L. *sin.* of 12° 33′ 15″ is 9·337185: the *diff.* for 15″ is 141, the nearest to which under 15 is 140, the last 0 in 1400 being

considered a decimal fraction. The corresponding number under 8 (which 23″ is above 15″) is 74·7, where the last figure is supposed a decimal fraction. Adding, therefore, 74·7 or 75 to 9·337185, we have the required L. *sin.*, namely, 9·337260. . . . The mode of finding an arc to the nearest second, by means of this table, will be apparent from the following example. Let the arc be required corresponding to L. *sin.* 9·337260. The next in the table of L. *sines* is 9·337185, which is less than the given L. *sine* by 75. Looking for the nearest to 75 in the same horizontal line with the *diff.* for 15″ or 141, considering in both cases the last figure as a decimal fraction, we find 8 at the top. Consequently, the required arc is 12° 33′ 15″ + 8″, or 12° 33′ 23″.

This table may be used also in a similar manner when the prop. part is given for 1^h or 60^m; or for 12^h (*12*), as in the case of the moon's hor. parallax and semi-diameter.

Table 33, p. 305. **Half-Log. Haversines.**—This table is formed by halving the quantities given in Table 34; it is convenient for solving most cases of spherical triangles.

Table 34, p. 335. **Log. Haversines.**—This table gives the values of the logarithms of the haversines (half-versed sines) of angles from 0° or 0^h to 180° or 12^h, increased by ten to avoid negative quantities; it is derived from the logarithms of the quantities given in Table 36.

The table is calculated for every 15″ of arc or each second of time from 0° to 135°, and from thence to 180° (since the values change very slowly) for every minute of arc or 4 seconds of time.

For angles exceeding 180° or 12^h, the value of the haversine of the deficit from 360° or 24^h is looked out, and for results required to the nearest second a proportional part of the change for 15″ must be taken.

The solution of spherical triangles by using the table of Log. haversines instead of the tables of ordinary Log. sines, &c., affords considerable abbreviation in the calculations, and is the method now most generally used (see Goodwin's Trigonometry).

Note.—Since hav. A. $= \frac{\text{vers. A}}{2} = \sin.^2 \frac{A}{2}$ the table may be derived from the ordinary table of L. sines, &c.; from the expression on the right hand side of the equation the table is sometimes termed that of "Log. sine square."

Table 35, p. 394. **Logarithms of Numbers.**—This table is calculated to base 10, and the figures given are the indices of the powers to which 10 must be raised to produce the numbers (see Goodwin's Trigonometry).

The first two pages contain the logarithms of numbers from one to a thousand; the other pages contain the logarithms of numbers from 1000 to 9999. To find the logarithm of any given number proceed as follows. If the number do not consist of more than four figures, they may all be found in the column of nat. numbers, and opposite them will be found the decimal part of the logarithm (mantissa). The

index or characteristic of the logarithm is equal to the number of places, which the first left hand significant figure of the natural number is from the place of units; and it will be positive, if the first significant figure be a whole number or integer, and negative, if it be a decimal fraction. Thus the logarithm of 234 is 2·369216, and that of 0·234 is $\bar{1}$·369216. If the number of figures in the given nat. number exceed four, look for the first four figures, and take out the corresponding logarithm; then look for the fifth figure among the last figures, that is, in the unit places of the nat. numbers which lie in the space of the column, wherein the first four figures have been found. Place the opposite figures in the column of prop. parts under the last figures of the logarithm already taken out, the last figures in each under one another. Then look for the second supernumerary figure, if there be one in the given nat. number, and put the corresponding figures in the prop. parts (carrying them one place to the right), under the last proportional part written down. Again, look for the third supernumerary figure in the given nat. number, if there be one, and put the corresponding part (carrying them still one place farther to the right) under the last prop. parts put down; and thus go on as far as it may be necessary. Lastly, add all the numbers, as they are put down, together; and take the result, to the nearest sixth place, for the logarithm required (see example on next page).

If any of the supernumerary figures be a cipher, pass over this, but take care to carry the next prop. parts put down, *two* places to the right.

To find from the table the nat. number of a given logarithm, proceed as follows. Look for the decimal part of the given logarithm in the column of logarithms. If this be found exactly, take out the corresponding number from the column of the nat. numbers. Then insert the decimal mark, so that the first significant figure may be as many places from the unit's place as there are units in the index of the given logarithm, to the left or right of the units, according as the index is positive or negative.

If there is not a sufficient number of places in the nat. number, when the index is positive, ciphers must be added to the right.

When the index is negative, put a cipher in the unit's place, and then other ciphers in continuation in the first decimal places, so that the first significant figure may be as far from the units as is denoted by the index.

When the decimal part of the given logarithm cannot be found exactly, find in the column of logarithms a number next below the decimal of the given logarithm; and take the difference between this and the said decimal. Look in the column of prop. parts, in the space from which the next less logarithm has been taken, for the number next below this difference; the last figure, that is, the figure in the unit's place of the nat. number opposite, will be the first figure to be added in continuation to the nat. number corresponding to the next less logarithm.

Take the number in the column of prop. parts, next below the aforesaid difference, from the difference itself, and add to the remainder a cipher. With this look again in the column of prop. parts for the

number next below it, and the last figure in the nat. number opposite will be the second additional figure.

Thus go on as far as may be necessary, taking the last additional figure to the nearest unit.

If the difference, or remainder, with the addition of one cipher, be less than any of the numbers in the column of prop. parts, the corresponding additional figure will be a cipher. Then add another cipher to the remainder, and proceed as above.*

Example.—Required the logarithm of 623472 and the nat. number of the logarithm 5·372642.

decimal part of log. of				
6234	·794767		5·372642	
prop. parts for 7 . .	49	next less . .	·372544	... 2358
„ for 2 . .	14			
		diff. . . .	98	
decimal part of reqd.				
log.	794817	in prop. parts	92	... 5
prefixing the index	5·794817			
			60	
			55	... 3
Reqd. nat. number to nearest unit		... 235853	50	

Cologarithms by which division may be performed by addition instead of subtraction, may be derived from logarithms as follows:—

Take out the logarithm from the table of logarithms, and subtract it (characteristic as well as mantissa) from 10 in the following manner; subtract every figure from 9, proceeding from left to right, to the last significant figure, which subtract from 10. Cast out as many tens in characteristic of result as there have been cologarithms used.

Thus, to find log. 5306 − log. 4814 + log. 8192 − log. 612, using addition only:—

log. 5306	3·724767
colog. 4814	6·317494
log. 8192	3·913390
colog. 612	7·213249
log. 14·76	1·168900

N.B.—The cologarithm may thus be taken *by sight* from a table of logarithms, by persons accustomed to the use of tables, as easily as the logarithm itself, and with greater security from material error, than from a table of cologarithms. The rule for finding the characteristic of the cologarithm differing from the rule by which the characteristic of the

* The index for whole numbers is always *one less* than the No. of integers or whole numbers. When the index is not negative, the No. of integral figures or whole numbers in the nat. number is *one more* than the index denotes.

logarithm is found, some considerable probability of serious error is involved in the use of special tables of cologarithms.

In the case of negative characteristics, their subtraction from 9 being apparently an addition, it is often as well to cast out the 10 from the cologarithm at once before proceeding to add up.

Thus, to find log. 53·06 − log ·04814 + log. 8·192 − log. ·00612 :—

log.	53·06 =	1·724767
colog.	·04814 =	× 1·317494
log.	8·192 =	0·913390
colog.	·00612 =	× 2·213249
		6·168900

Natural Versines.—This table gives the values of natural versines (see explanation of Table 44), multiplied by 1,000,000, so as to avoid fractional quantities. The real versine is found by placing a decimal point before the sixth figure from the right of the *tabular* versine. Table 36, p. 423.

To find the nat. versine of a given arc from this table, look for the degrees and minutes on the left-hand page, the degrees at the top and the minutes at the side; take out the corresponding number, observing that where only the last five figures are put down, the preceding figures printed at every third must be prefixed. Then putting the finger on the right-hand page at the nearest half degree to the degrees and minutes just looked out, move it down the corresponding column till it is opposite to the seconds of the given arc, as seen in either side column. The number where the finger is placed will be the parts for the seconds, to be added to the number taken from the left-hand page, placing the last figure under the last figure.

To find the arc for any given nat. versine, look for the next less in the left-hand page, and take it from the given one. At the same time, take out the degrees and minutes corresponding to the next less. Put your finger on the right-hand page at the nearest half degree to the degrees and minutes just taken out, move it down the corresponding column till you come to the difference between the given versine and the next less as just found, or to the nearest number thereto. Then the seconds on either side between which the figure is placed will be the seconds in the required arc, to be written after the degrees and minutes taken out.

If the minutes of an arc be nearly 15′, or 45′, in that case, where great accuracy is required, the mean of two parts for seconds may be taken, for the next less half degree and the next greater.

The versines of arcs expressed in time as far as 36 minutes are given in the three first pages of the table.

Bearing Amplitude and Time Amplitude at the Rising and Setting of the Sun.—By the bearing amplitude of the sun is meant the arc of the horizon intercepted between the east point and the point where the sun rises, or between the west point and the point where it sets. It is Table 37, p. 462.

reckoned from the east and west points towards the north or south, according as the declination is north or south.

By the time amplitude is meant the time the sun rises before or after 6 A.M., or sets before or after 6 P.M. When the latitude and declination are both north or both south, the sun rises so much before 6 A.M., and sets so much after 6 P.M. When the latitude and declination are one north and the other south, the sun rises so much after 6 A.M., and sets so much before 6 P.M.

Each of these amplitudes is found by entering the table with the nearest degree to the declination at the top, and the nearest degree to the latitude at the side. This will be sufficient for most nautical purposes.

The table is computed from the quadrantal triangle formed by the colatitude, polar distance, and zenith distance of the sun's centre when on the horizon; it therefore gives (expressed in apparent time) the time and bearing, with regard to the *centre* of the true sun at rising and setting, from which the *observed* times may differ some minutes, since the effects of dip, refraction, and parallax are not allowed for in the table. It may, of course, be used for any other heavenly body whose declination does not exceed that of the sun; the time amplitude, in that case, does not represent the times before or after 6 A.M. or 6 P.M., but before or after crossing the six o'clock hour circle.

Table 38, p. 466.

Reduction of Horizontal Parallax and Latitude of Place for Figure of Earth.—Owing to the form of the earth being that of an oblate spheroid, its radius is greatest in the plane of the equator; and hence the horizontal parallax at a heavenly body (from which the parallax in altitude is deduced) is less in any latitude north or south than that taken out of the Nautical Almanac, which is always the *equatorial* horizontal parallax.

The table is formed from the equation $H - H' = H\frac{1}{c}\ \sin.^2 l$ (derived from the properties of the ellipse), where H and H′ represent the horizontal parallaxes at the equator, and in latitude l respectively, and $\frac{1}{c}$ the compression, assumed to be $\frac{1}{289}$.

The table is adapted for observations of the moon, the reduction for every 6° of lat. being calculated for horizontal parallaxes between 54′ and 62′.

The true or geographical latitude L being the angle made with the plane of the equator by a perpendicular to the earth's surface at the place of the observer, the reduced or geocentric latitude l is the angle made with the same plane by the earth's *radius* at the same place, and if a and b represent the earth's equatorial and polar radii respectively, from the properties of the ellipse $\tan. l = \frac{b^2}{a^2} \tan. L$.

By means of this, with a value of $\frac{b^2}{a^2}$ for compression $= \frac{1}{289}$, l is calculated and hence the red. of lat. $(L - l)$.

Reduction of Semi-diameter on account of Refraction.—The effect of refraction being to elevate the lower limbs of the sun or moon more than their upper limbs, these bodies assume a more or less flattened or oval form, the vertical diameter being contracted, but not the horizontal diameter; hence to reduce to the centre any observation measured to a certain point on a *limb*, the semi-diameter to be applied is generally less than that taken from the Nautical Almanac, which is always the *horizontal* semi-diameter. Table 39, p. 466.

The table is calculated from the equation $C = C_1 \sin. {}^2i$ (see Chauvenet's Astronomy), where C and C_1 are the contractions of the inclined and vertical semi-diameters, and i is the inclination of the latter to the horizon, C_1 being known from the table of refraction (Table 12).

This table, applicable alike to the sun and moon, is occasionally of use in the lunar observation when the altitude of either is low.

Correction of A for Planet in clearing Distance.—The auxiliary angle A (*see* Table 24) employed in clearing the lunar distance is found from the equation—cos. $A = \frac{\sin. z \sin. z'}{2 \cos. a \cos. a'}$ (see "Navigation," p. 244), where z and z' represent the *true* zenith distances of the moon's centre and of a star, and a and a' the *apparent* altitudes. Table 40, p. 466.

In constructing the table the factor $\frac{\sin. z'}{\cos. a'}$ is regarded as having a constant value for *stars* between the apparent altitudes of 30° and 90°, the logarithm of that factor, or the logarithm of the difference between the cosines of the true and apparent altitudes, being taken as ·000120.

The small auxiliary tables $\frac{A}{\odot}$ $\frac{A}{*}$ are the further corrections to be applied at *all* altitudes of the sun (⊙), and at all below 30° of a star (*), owing to the fact that since parallax as well as refraction affects the position of the sun, the logarithm of the factor regarded as constant in constructing the main table is *never* equal to ·000120 in the case of the sun, nor in the case of a star can it be assumed as such with an apparent altitude of less than 30°.

The differences between the apparent and true altitudes of a *star* between 0° and 30° being always *greater* than the corresponding differences between 30° and 90°, and in the case of the sun such differences being *always* greater at *any* altitude when parallax is considered as well as refraction, it follows that the correction of the auxiliary angle taken from the main tables will in both cases be *additive*.

Theoretically the change in the value of the log factor from ·000120 will affect the value of A differently for successive values of $\frac{\sin. z}{2 \cos. a}$, but as the change is always very small it is practically correct to assume that it will equally affect the angle A for *all* values of $\frac{\sin. z}{2 \cos. a}$, and the table is constructed by taking from the table of L. cosines the number

of seconds of arc corresponding to the change of L. cosine for an angle A = 60°.

In the case of the lunar distance being observed to a planet this correction is taken from Table 40, for the sun and stars it is given in Table 24.

Table 41, p. 466. **Correction of Auxiliary Angle for Thermometer and Barometer.**—The value of the auxiliary angle A given in Table 24 is calculated for the *mean* refraction in Table 12.

To further correct this for the actual refraction at time of observation the effect of change of refraction given in Table 13 is separately dealt with for the altitude of each body observed.

Table 42, p. 467. **Proportional Logarithms.**—The proportional logarithm of any angle expressed either in arc or time, is the logarithm of the number of seconds in 3° or 3^h (10800) minus the logarithm of the number of seconds of arc or time contained in the given angle, thus the prop. log. of 2° 10′ or 2^h 10^m is log. 10800 – log. 7800. These logarithms are applicable to the solution of all questions of simple proportion where one of the given terms is 3° or 3^h. Their use in navigation is practically restricted to obtaining the Greenwich mean time corresponding to a lunar distance (see "Navigation," p. 248).

The first page of this table may be of use in finding the proportional logarithm of a small quantity expressed in seconds and tenths of seconds.

Table 43, p. 487. **Correction for Second Differences of Lunar Distances.**—In most of the practical problems of navigation when the Greenwich date does not *exactly* correspond with the epoch for which the required element (declination, equation of time, &c,) is predicted in the Nautical Almanac, it is sufficiently accurate to consider the rate of change of the element at the time of observation to correspond with that given in the Almanac for some preceding or following instant, thus the "Var. in 1 hour" on page 1 of each month is the rate of variation at the instant of apparent noon at Greenwich, and the "Var. in 10^m" on page v. is the rate of variation at the commencement of each hour at Greenwich.

In some few cases (especially the longitude by lunar) it is desirable to apply a correction for the variable rate of change of the elements employed. In the case of the lunar it is a correction due to the fact that the distance between the moon and a star or the sun does not increase or decrease *uniformly*, and therefore the proportional logarithms of the change in 3 hours (P.L. diff. at the *middle* of the 3 hours) do not increase or decrease uniformly. This correction may be obtained by means of Table 43 in the following manner:

1. Find the approximate interval by the usual rule (see "Navigation," p. 248).

2. Take the differences between the proportional logarithm following the distance in the Nautical Almanac, and the proportional logarithms immediately to the left and right, and note the *mean* of these differences.

3. With the approximate interval and this *mean* difference, as arguments, take out the correction from the table.

4. If the proportional logarithms are *decreasing*, *add* the correction to the approximate time; but if *increasing*, *subtract* it: the result will be the Greenwich mean time.

Example I.—Suppose it were required to find the Greenwich mean astronomical time, at which the *reduced* distance between the moon and Antares would be 45° 40′ 8″ about July 8, 1886. It appears, by inspecting the distances, that the *nearest* distance *preceding* it, in order of time, is that on July 8 at *midnight*, therefore,

	°	′	″			
Distance at *midnight*	46	30	56	and	P.L. . .	2589
Reduced distance .	45	40	8			
Difference . . .	0	50	48	„	P.L. . .	5494
Approximate interval	1ʰ 32ᵐ 12ˢ			„	P.L. . .	2905

The proportional logarithm following the distance in the Almanac is 2589, those immediately to the left and right are respectively 2570 and 2609, the differences are therefore 19 and 20, and the *mean* of them 19·5.

Opposite to 1ʰ 32ᵐ 12ˢ (or the quantity nearest to it, 1ʰ 30ᵐ), and under 20 in the table, we have for the correction 6ˢ, which, *subtracted* from the approximate interval, 1ʰ 32ᵐ 12ˢ, because the proportional logarithms are *increasing*, gives 1ʰ 32ᵐ 6ˢ for the true interval after *midnight:* the Greenwich mean astronomical time is therefore July 8, 13ʰ 32ᵐ 6ˢ. The omission of this correction would produce an error of 1′·5 in the longitude.

It will sometimes happen that the *mean* difference of the proportional logarithms will exceed the limit of the table of correction; in this case the table may be entered with the approximate interval, and *any fraction* of the difference and the corresponding correction *increased in like proportion.*

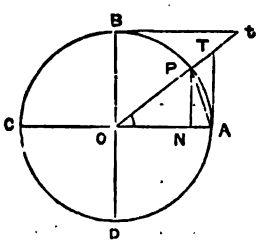
Example II.—Suppose it were required to find the Greenwich mean astronomical time, at which the *reduced* distance between the moon and Fomalhaut would be 28° 6′ 4″ about June 23, 1886. By inspecting the distances, it appears that the nearest preceding is on June 23, at VIʰ; therefore,

	°	′	″			
Distance at VIʰ. . .	27	37	9	and	P.L. . .	5107
Reduced distance .	28	6	4			
Difference . . .	0	28	55	„	P.L. . .	7941
Approximate interval	1ʰ 33ᵐ 44ˢ			„	P.L. . .	2834

The *mean* difference between the proportional logarithms determined as in the preceding example is 219, one half of which is 110; and under 110 in the table, and opposite $1^h\ 30^m$, is 34^s: the correction is therefore 68^s to be *added* to the approximate interval, because the proportional logarithms are *decreasing;* the Greenwich mean astronomical time is therefore June 23, $7^h\ 34^m\ 52^s$. The omission of the correction would produce an error of 17′ in longitude; it may, however, be considered as an extreme case, and such as will seldom be met with.

Table 44, p. 488.

Natural Sines, Tangents, Secants, &c.—If in the accompanying figure P O A represents any angle θ, and A B C D a circle described from O as centre with any radius, then if that radius be considered to be unity:—



PN = sine θ, AT = tangent θ, OT = secant θ.
ON = co-sine θ, Bt = cotangent θ, Ot = co-secant θ.
AN = versed sine (vers.) θ, $\frac{AN}{2}$ = haversine θ, and PA = chord of θ.

The multiples, sub-multiples, or parts of the radius which the above lines represent form the *natural* trigonometrical ratios given in this table, and which are also generally engraved on protractors.

From the preceding figure the reader will see easily that:—

(1.) When an angle is very small, the sine, chord, and tangent are practically equal to one another.

(2.) When an angle is nearly 90° the cosine and cotangent are practically equal to one another.

(3.) Under all circumstances the sine and cosine are never greater than the radius, and the secant and cosecant never less; the chord equals the radius when the angle is 60°, and the tangent and cotangent both equal it when the angle is 45°, the tangent and secant becoming infinite at 90°, and the cotangent and cosecant at 0°.

The length of the chord may be derived from the formula:—

$$\text{Chord of } \theta = 2 \sin. \frac{\theta}{2}$$

Table 45, p. 518.

Corresponding Thermometric Scales.—The thermometers in common use are Fahrenheit's, the Centigrade, and Reaumur's. In the former the freezing-point of water is marked 32°, and in both the latter 0°, the space between this point and the boiling-point of water being divided into 180 equal parts in the first, 100 parts in the second, and 80 in the third, so that the indications of the same temperature by each of the three instruments are connected by these equations—

$$\text{Fahr.} = \text{Cent.} \times \tfrac{9}{5} + 32^\circ = \text{Reau.} \times \tfrac{9}{4} + 32^\circ,$$

from which equations this table has been constructed.

Corresponding Measures.—This table (taken from Deschanel's Natural Philosophy) shows the connection between the metric system of measurement (usually now adopted in scientific works) and that in common use. Table 46, p. 519.

Astronomical Data.—The principal approximate astronomical elements of the solar system are here brought together for reference—they are taken from modern authorities. Table 47, p. 519.

Abbreviations in Admiralty Charts.—This table shows the principal *verbal* abbreviations used on Admiralty charts. A complete list of these, with *graphical* illustrations of the symbols used, is published by the Admiralty and placed in all chart boxes. Table 48, p. 520.

Secondary Meridians.—In the construction of charts the longitudes of all positions are originally obtained with reference to certain standard places termed secondary meridians. Table 49, p. 520.

The positions of these meridians depend upon both absolute and relative observations, extending in most cases over very many years; they are connected with each other and with Greenwich by both chronometric and telegraphic measurements.

Table of Positions.—This list of latitudes and longitudes of places on the sea-coast, &c., is taken from the American official edition of Bowditch's Practical Navigator, 1886. A few corrections have been made from later authorities. Table 50, p. 522.

Distance Table.—The information given in this table is chiefly derived from Admiralty charts Nos. 1077 and 1078, upon which are shown the tracks recommended for steam vessels, between the various principal ports of the world, at all seasons of the year. Table 51, p. 549.

Points of Compass, &c.

Name of Point.		Points.	In Degrees.			Log. Sine.	Name of Point.	
North.			°	′	″		South.	
N. ¼ E.	N. ¼ W.	¼	2	48	45	8.690796	S. ¼ E.	S. ¼ W.
N. ½ E.	N. ½ W.	½	5	37	30	8.991302	S. ½ E.	S. ½ W.
N. ¾ E.	N. ¾ W.	¾	8	26	15	9.166520	S. ¾ E.	S. ¾ W.
N. by E.	N. by W.	1	11	15	0	9.290236	S. by E.	S. by W.
N. by E. ¼ E.	N. by W. ¼ W.	1 ¼	14	3	45	9.385571	S. by E. ¼ E.	S. by W. ¼ W.
N. by E. ½ E.	N. by W. ½ W.	1 ½	16	52	30	9.462824	S. by E. ½ E.	S. by W. ½ W.
N. by E. ¾ E.	N. by W. ¾ W.	1 ¾	19	41	15	9.527488	S. by E. ¾ E.	S. by W. ¾ W.
N.N.E.	N.N.W.	2	22	30	0	9.582840	S.S.E.	S.S.W.
N.N.E. ¼ E.	N.N.W. ¼ W.	2 ¼	25	18	45	9.630992	S.S.E. ¼ E.	S.S.W. ¼ W.
N.N.E. ½ E.	N.N.W. ½ W.	2 ½	28	7	30	9.673387	S.S.E. ½ E.	S.S.W. ½ W.
N.N.E. ¾ E.	N.N.W. ¾ W.	2 ¾	30	56	15	9.711050	S.S.E. ¾ E.	S.S.W. ¾ W.
N.E. by N.	N.W. by N.	3	33	45	0	9.744739	S.E. by S.	S.W. by S.
N.E. ¾ N.	N.W. ¾ N.	3 ¼	36	33	45	9.775027	S.E. ¾ S.	S.W. ¾ S.
N.E. ½ N.	N.W. ½ N.	3 ½	39	22	30	9.802359	S.E. ½ S.	S.W. ½ S.
N.E. ¼ N.	N.W. ¼ N.	3 ¾	42	11	15	9.827084	S.E. ¼ S.	S.W. ¼ S.
N.E.	N.W.	4	45	0	0	9.849485	S.E.	S.W.
N.E. ¼ E.	N.W. ¼ W.	4 ¼	47	48	45	9.869790	S.E. ¼ E.	S.W. ¼ W.
N.E. ½ E.	N.W. ½ W.	4 ½	50	37	30	9.888185	S.E. ½ E.	S.W. ½ W.
N.E. ¾ E.	N.W. ¾ W.	4 ¾	53	26	15	9.904828	S.E. ¾ E.	S.W. ¾ W.
N.E. by E.	N.W. by W.	5	56	15	0	9.919846	S.E. by E.	S.W. by W.
N.E. by E. ¼ E.	N.W. b. W. ¼ W.	5 ¼	59	3	45	9.933350	S.E. by E. ¼ E.	S.W. by W. ¼ W.
N.E. by E. ½ E.	N.W. b. W. ½ W.	5 ½	61	52	30	9.945430	S.E. by E. ½ E.	S.W. by W. ½ W.
N.E. by E. ¾ E.	N.W. b. W. ¾ W.	5 ¾	64	41	15	9.956163	S.E. by E. ¾ E.	S.W. by W. ¾ W.
E.N.E.	W.N.W.	6	67	30	0	9.965615	E.S.E.	W.S.W.
E. by N. ¾ N.	W. by N. ¾ N.	6 ¼	70	18	45	9.973841	E. by S. ¾ S.	W. by S. ¾ S.
E. by N. ½ N.	W. by N. ½ N.	6 ½	73	7	30	9.980885	E. by S. ½ S.	W. by S. ½ S.
E. by N. ¼ N.	W. by N. ¼ N.	6 ¾	75	56	15	9.986786	E. by S. ¼ S.	W. by S. ¼ S.
E. by N.	W. by N.	7	78	45	0	9.991574	E. by S.	W. by S.
E. ¾ N.	W. ¾ N.	7 ¼	81	33	45	9.995274	E. ¾ S.	W. ¾ S.
E. ½ N.	W. ½ N.	7 ½	84	22	30	9.997904	E. ½ S.	W. ½ S.
E. ¼ N.	W. ¼ N.	7 ¾	87	11	15	9.999477	E. ¼ S.	W. ¼ S.

TABLE 2.

Length of a Degree (60′) of Longitude in different Latitudes.

Lat.	Statute Miles.	Naut. Miles.	Lat.	Statute Miles.	Naut. Miles.	Lat.	Statute Miles.	Naut. Miles.	Lat.	Statute Miles.	Naut. Miles.
°			°			°			°		
0	69·16	60·00	23	63·69	55·26	46	48·13	41·75	68	25·98	22·54
1	·15	59·99	24	·22	54·84	47	47·25	40·99	69	24·86	21·56
2	·12	·96	25	62·72	54·41	48	46·36	·22	70	23·72	20·58
3	·07	·92	26	·20	53·96	49	45·46	39·44	71	22·58	19·59
4	68·99	·85	27	61·66	·50	50	44·54	38·64	72	21·43	18·60
5	68·90	59·77	28	·11	·02	51	43·61	37·83	73	20·28	17·60
6	·78	·67	29	60·54	52·52	52	42·67	·02	74	19·12	16·59
7	·65	·55	30	59·94	52·00	53	41·71	36·19	75	17·96	15·58
8	·49	·42	31	·33	51·48	54	40·74	35·34	76	16·78	14·56
9	·31	·26	32	58·71	50·93	55	39·76	34·49	77	15·61	13·54
10	68·12	59·09	33	·06	·37	56	38·76	33·63	78	14·42	12·51
11	67·90	58·90	34	57·40	49·79	57	37·76	32·75	79	13·24	11·48
12	·66	·70	35	56·71	49·20	58	36·74	31·87	80	12·05	10·45
13	·40	·47	36	·02	48·60	59	35·71	30·98	81	10·85	9·42
14	·12	·23	37	55·30	47·98	60	34·67	30·08	82	9·66	8·38
15	66·82	57·97	38	54·57	·34	61	33·61	29·16	83	8·46	7·34
16	·50	·69	39	53·82	46·69	62	32·55	28·24	84	7·25	6·29
17	·16	·39	40	53·05	46·03	63	31·48	27·31	85	6·05	5·25
18	65·80	·08	41	52·27	45·35	64	30·40	26·37	86	4·84	4·20
19	·42	56·75	42	51·47	44·66	65	29·31	25·42	87	3·63	3·15
20	65·01	56·40	43	50·66	43·95	66	28·21	24·47	88	2·42	2·10
21	64·59	·04	44	49·83	·23	67	27·10	23·51	89	1·21	1·05
22	·15	55·66	45	48·99	42·50						

Traverse Table.

Distance.	1		2		3		4		5		6		7		8		
Cmse.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Cmse.
Pts.																	Pts.
¼	01.0	00.0	02.0	00.1	03.0	00.1	04.0	00.2	05.0	00.2	06.0	00.3	07.0	00.3	08.0	00.4	7¾
½	01.0	00.1	02.0	00.2	03.0	00.3	04.0	00.4	05.0	00.5	06.0	00.6	07.0	00.7	08.0	00.8	½
¾	01.0	00.1	02.0	00.3	03.0	00.4	04.0	00.6	04.9	00.7	05.9	00.9	06.9	01.0	07.9	01.2	¼
1	01.0	00.2	02.0	00.4	02.9	00.6	03.9	00.8	04.9	01.0	05.9	01.2	06.9	01.4	07.8	01.6	7
¼	01.0	00.2	01.9	00.5	02.9	00.7	03.9	01.0	04.9	01.2	05.8	01.5	06.8	01.7	07.8	01.9	¾
½	01.0	00.3	01.9	00.6	02.9	00.9	03.8	01.2	04.8	01.5	05.7	01.7	06.7	02.0	07.7	02.3	½
¾	00.9	00.3	01.9	00.7	02.8	01.0	03.8	01.3	04.7	01.7	05.6	02.0	06.6	02.4	07.5	02.7	¼
2	00.9	00.4	01.8	00.8	02.8	01.1	03.7	01.5	04.6	01.9	05.5	02.3	06.5	02.7	07.4	03.1	6
¼	00.9	00.4	01.8	00.9	02.7	01.3	03.6	01.7	04.5	02.1	05.4	02.6	06.3	03.0	07.2	03.4	¾
½	00.9	00.5	01.8	00.9	02.6	01.4	03.5	01.9	04.4	02.4	05.3	02.8	06.2	03.3	07.1	03.8	½
¾	00.9	00.5	01.7	01.0	02.6	01.5	03.4	02.1	04.3	02.6	05.1	03.1	06.0	03.6	06.9	04.1	¼
3	00.8	00.6	01.7	01.1	02.5	01.7	03.3	02.2	04.2	02.8	05.0	03.3	05.8	03.9	06.7	04.4	5
¼	00.8	00.6	01.6	01.2	02.4	01.8	03.2	02.4	04.0	03.0	04.8	03.6	05.6	04.2	06.4	04.8	¾
½	00.8	00.6	01.5	01.3	02.3	01.9	03.1	02.5	03.9	03.2	04.6	03.8	05.4	04.4	06.2	05.1	½
¾	00.7	00.7	01.5	01.3	02.2	02.0	03.0	02.7	03.7	03.4	04.4	04.0	05.2	04.7	05.9	05.4	¼
4	00.7	00.7	01.4	01.4	02.1	02.1	02.8	02.8	03.5	03.5	04.2	04.2	04.9	04.9	05.7	05.7	4
1°	01.0	00.0	02.0	00.0	03.0	00.1	04.0	00.1	05.0	00.1	06.0	00.1	07.0	00.1	08.0	00.1	89°
2	01.0	00.0	02.0	00.1	03.0	00.1	04.0	00.1	05.0	00.2	06.0	00.2	07.0	00.2	08.0	00.3	88
3	01.0	00.1	02.0	00.1	03.0	00.2	04.0	00.2	05.0	00.2	06.0	00.3	07.0	00.4	08.0	00.4	87
4	01.0	00.1	02.0	00.1	03.0	00.2	04.0	00.3	05.0	00.3	06.0	00.4	07.0	00.5	08.0	00.6	86
5	01.0	00.1	02.0	00.2	03.0	00.3	04.0	00.3	05.0	00.4	06.0	00.5	07.0	00.6	08.0	00.7	85
6	01.0	00.1	02.0	00.2	03.0	00.3	04.0	00.4	05.0	00.5	06.0	00.6	07.0	00.7	08.0	00.8	84
7	01.0	00.1	02.0	00.2	03.0	00.4	04.0	00.5	05.0	00.6	06.0	00.7	06.9	00.9	07.9	01.0	83
8	01.0	00.1	02.0	00.3	03.0	00.4	04.0	00.6	05.0	00.7	05.9	00.8	06.9	01.0	07.9	01.1	82
9	01.0	00.2	02.0	00.3	03.0	00.5	04.0	00.6	04.9	00.8	05.9	00.9	06.9	01.1	07.9	01.3	81
10	01.0	00.2	02.0	00.3	03.0	00.5	03.9	00.7	04.9	00.9	05.9	01.0	06.9	01.2	07.9	01.4	80
11	01.0	00.2	02.0	00.4	02.9	00.6	03.9	00.8	04.9	01.0	05.9	01.1	06.9	01.3	07.9	01.5	79
12	01.0	00.2	02.0	00.4	02.9	00.6	03.9	00.8	04.9	01.0	05.9	01.2	06.8	01.5	07.8	01.7	78
13	01.0	00.2	01.9	00.4	02.9	00.7	03.9	00.9	04.9	01.1	05.8	01.3	06.8	01.6	07.8	01.8	77
14	01.0	00.2	01.9	00.5	02.9	00.7	03.9	01.0	04.9	01.2	05.8	01.5	06.8	01.7	07.8	01.9	76
15	01.0	00.3	01.9	00.5	02.9	00.8	03.9	01.0	04.8	01.3	05.8	01.6	06.8	01.8	07.7	02.1	75
16	01.0	00.3	01.9	00.6	02.9	00.8	03.8	01.1	04.8	01.4	05.8	01.7	06.7	01.9	07.7	02.2	74
17	01.0	00.3	01.9	00.6	02.9	00.9	03.8	01.2	04.8	01.5	05.7	01.8	06.7	02.0	07.7	02.3	73
18	01.0	00.3	01.9	00.6	02.9	00.9	03.8	01.2	04.8	01.5	05.7	01.9	06.7	02.2	07.6	02.5	72
19	00.9	00.3	01.9	00.7	02.8	01.0	03.8	01.3	04.7	01.6	05.7	02.0	06.6	02.3	07.6	02.6	71
20	00.9	00.3	01.9	00.7	02.8	01.0	03.8	01.4	04.7	01.7	05.6	02.1	06.6	02.4	07.5	02.7	70
21	00.9	00.4	01.9	00.7	02.8	01.1	03.7	01.4	04.7	01.8	05.6	02.2	06.5	02.5	07.5	02.9	69
22	00.9	00.4	01.9	00.7	02.8	01.1	03.7	01.5	04.6	01.9	05.6	02.2	06.5	02.6	07.4	03.0	68
23	00.9	00.4	01.8	00.8	02.8	01.2	03.7	01.6	04.6	02.0	05.5	02.3	06.4	02.7	07.4	03.1	67
24	00.9	00.4	01.8	00.8	02.7	01.2	03.7	01.6	04.6	02.0	05.5	02.4	06.4	02.8	07.3	03.3	66
25	00.9	00.4	01.8	00.8	02.7	01.3	03.6	01.7	04.5	02.1	05.4	02.5	06.3	03.0	07.3	03.4	65
26	00.9	00.4	01.8	00.9	02.7	01.3	03.6	01.8	04.5	02.2	05.4	02.6	06.3	03.1	07.2	03.5	64
27	00.9	00.5	01.8	00.9	02.7	01.4	03.6	01.8	04.5	02.3	05.3	02.7	06.2	03.2	07.1	03.6	63
28	00.9	00.5	01.8	00.9	02.6	01 4	03.5	01.9	04.4	02.3	05.3	02.8	06.2	03.3	07.1	03.8	62
29	00.9	00.5	01.7	01.0	02.6	01.5	03.5	01.9	04.4	02.4	05.2	02.9	06.1	03.4	07.0	03.9	61
30	00.9	00.5	01.7	01.0	02.6	01.5	03.5	02.0	04.3	02.5	05.2	03.0	06.1	03.5	06.9	04.0	60
31	00.9	00.5	01.7	01.0	02.6	01.5	03.4	02.1	04.3	02.6	05.1	03.1	06.0	03.6	06.9	04.1	59
32	00.8	00.5	01.7	01.1	02.5	01.6	03.4	02.1	04.2	02.6	05.1	03.2	05.9	03.7	06.8	04.2	58
33	00.8	00.5	01.7	01.1	02.5	01.6	03.4	02.2	04.2	02.7	05.0	03.3	05.9	03.8	06.7	04.4	57
34	00.8	00.6	01.7	01.1	02.5	01.7	03.3	02.2	04.1	02.8	05.0	03.4	05.8	03.9	06.6	04.5	56
35	00.8	00.6	01.6	01.1	02.5	01.7	03.3	02.3	04.1	02.9	04.9	03.4	05.7	04.0	06.6	04.6	55
36	00.8	00.6	01.6	01.2	02 4	01.8	03.2	02.4	04.0	02.9	04.9	03.5	05.7	04.1	06.5	04.7	54
37	00.8	00.6	01.6	01.2	02.4	01.8	03.2	02.4	04.0	03.0	04.8	03.6	05.6	04.2	06.4	04.8	53
38	00.8	00.6	01.6	01.2	02.4	01.8	03.2	02.5	03.9	03.1	04.7	03.7	05.5	04.3	06.3	04.9	52
39	00.8	00.6	01.6	01.3	02.3	01.9	03.1	02.5	03.9	03.1	04.7	03.8	05.4	04.4	06.2	05.0	51
40	00.8	00.6	01.5	01.3	02.3	01.9	03.1	02.6	03.8	03.2	04.6	03.9	05.4	04.5	06.1	05.1	50
41	00.8	00.7	01.5	01.3	02.3	02.0	03.0	02.6	03.8	03.3	04.5	03.9	05.3	04 6	06.0	05.2	49
42	00.7	00.7	01.5	01.3	02.2	02.0	03.0	02.7	03.7	03.3	04.5	04.0	05.2	04.7	05.9	05.4	48
43	00.7	00.7	01.5	01.4	02.2	02.0	02.9	02.7	03.7	03.4	04.4	04.1	05.1	04.8	05.9	05.5	47
44	00.7	00.7	01.4	01.4	02.2	02.1	02.9	02.8	03.6	03.5	04.3	04.2	05.0	04.9	05.8	05.6	46
45	00.7	00.7	01 .4	01.4	02.1	02.1	02.8	02.8	03.5	03.5	04.2	04.2	04.9	04.9	05.7	05.7	45
Cmse.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Cmse.

Traverse Table.

Distance	9		10		11		12		13		14		15		16		
Dist.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Dist.
Fn.																	Fn.
¼	09.0	00.4	10.0	00.5	11.0	00.5	12.0	00.6	13.0	00.6	14.0	00.7	15.0	00.7	16.0	00.8	¼
½	09.0	00.9	10.0	01.0	10.9	01.1	11.9	01.2	12.9	01.3	13.9	01.4	14.9	01.5	15 9	01.6	½
¾	08 9	01.3	09.9	01.5	10.9	01.6	11.9	01.8	12.9	01.9	13.8	02.1	14.8	02.2	15.8	02.3	¾
1	08.8	01.8	09.8	02.0	10.8	02.1	11.8	02.3	12.7	02.5	13.7	02.7	14.7	02.9	15.7	03.1	1
¼	08.7	02.2	09.7	02.4	10.7	02.7	11.6	02.9	12.6	03.2	13.6	03.4	14.6	03.6	15.5	03.9	¼
½	08 6	02.6	09.6	02.9	10.5	03.2	11.5	03.5	12.4	03.8	13.4	04.1	14.4	04.4	15.3	04.6	½
¾	08.5	03.0	09.4	03.4	10.4	03.7	11.3	04.0	12.2	04.4	13.2	04.7	14.1	05.1	15.1	05.4	¾
2	08.3	03.4	09 2	03.8	10.2	04.2	11.1	04.6	12.0	05.0	12.9	05 4	13.9	05.7	14.8	06.1	5
¼	08.1	03.8	09.0	04.3	09.9	04.7	10.8	05.1	11.8	05.6	12.7	06.0	13.6	06.4	14.5	06.8	¼
½	07.9	04 2	08.8	04.7	09.7	05.2	10.6	05.7	11.5	06.1	12.3	06.6	13.2	07.1	14.1	07.5	½
¾	07.7	04.6	08.6	05.1	09.4	05.7	10.3	06.2	11.2	06.7	12.0	07.2	12.9	07.7	13.7	08.2	¾
3	07.5	05 0	08 3	05.6	09.1	06.1	10.0	06.7	10.8	07.2	11.6	07.8	12.5	08.3	13 3	08.9	5
¼	07.2	05.4	08.0	06.0	08.8	06.6	09.6	07.1	10.4	07.7	11.2	08.3	12.0	08.9	12.8	09.5	¼
½	07.0	05.7	07·7	06.3	08.5	07.0	09.3	07.6	10.1	08.2	10.8	08.9	11.6	09.5	12.4	10.1	½
¾	06.7	06.0	07.4	06.7	08.2	07.4	08.9	08.1	09.6	08.7	10.4	09.4	11.1	10.1	11.9	10.7	¾
4	06.4	06.4	07.1	07.1	07.8	07.8	08.5	08.5	09.2	09.2	09.9	09.9	10.6	10.6	11.3	11.3	4
1	09.0	00.2	10.0	00.2	11.0	00.2	12.0	00.2	13.0	00.2	14.0	00.2	15.0	00.3	16.0	00.3	89
2	09.0	00.3	10.0	00.3	11.0	00.4	12.0	00.4	13.0	00.5	14.0	00.5	15.0	00.5	16.0	00.6	88
3	09.0	00.5	10.0	00.5	11.0	00.6	12.0	00.6	13.0	00.7	14.0	00.7	15.0	00.8	16.0	00.8	87
4	09.0	00.6	10.0	00.7	11.0	00.8	12.0	00.8	13.0	00.9	14.0	01.0	15.0	01.0	16.0	01.1	86
5	09.0	00.8	10.0	00.9	11.0	01.0	12.0	01.0	13.0	01.1	13.9	01.2	14.9	01.3	15.9	01.4	85
6	09.0	00.9	09.9	01.0	10.9	01.1	11.9	01.3	12.9	01.4	13 9	01.5	14.9	01.6	15.9	01.7	84
7	08.9	01.1	09.9	01.2	10.9	01.3	11.9	01.5	12.9	01.6	13.9	01.7	14.9	01.8	15.9	01.9	83
8	08.9	01.3	09.9	01.4	10.9	01.5	11.9	01.7	12 9	01.8	13.9	01.9	14.9	02.1	15.8	02.2	82
9	08.9	01.4	09.9	01.6	10.9	01.7	11.9	01.9	12.8	02.0	13.8	02.2	14.8	02.3	15.8	02.5	81
10	08.9	01.6	09.8	01.7	10.8	01.9	11.8	02.1	12.8	02.3	13.8	02.4	14.8	02.6	15.8	02.8	80
11	08.8	01.7	09.8	01.9	10.8	02.1	11.8	02.3	12.8	02.5	13.7	02.7	14.7	02.9	15.7	03.1	79
12	08.8	01.9	09.8	02.1	10.8	02.3	11.7	02.5	12.7	02.7	13.7	02.9	14.7	03.1	15.7	03.3	78
13	08.8	02.0	09.7	02.2	10.7	02.5	11.7	02.7	12.7	02.9	13.6	03.1	14.6	03.4	15.6	03.6	77
14	08.7	02.2	09.7	02.4	10.7	02.7	11.6	02.9	12.6	03.1	13.6	03.4	14.6	03.6	15.5	03.9	76
15	08 7	02.3	09.7	02.6	10.6	02.8	11.6	03.1	12.6	03.4	13.5	03.6	14.5	03.9	15.5	04.1	75
16	08 7	02.5	09.6	02.8	10.6	03.0	11.5	03.3	12.5	03.6	13.5	03.9	14.4	04.1	15.4	04.4	74
17	08.6	02.6	09.6	02.9	10.5	03.2	11.5	03.5	12.4	03.8	13.4	04.1	14.3	04.4	15.3	04.7	73
18	08 6	02.8	09.5	03.1	10.5	03.4	11.4	03.7	12.4	04.0	13.3	04.3	14.3	04.6	15.2	04.9	72
19	08.5	02.9	09.5	03.3	10.4	03.6	11.3	03.9	12.3	04.2	13.2	04.6	14.2	04.9	15.1	05.2	71
20	08 5	03.1	09.4	03.4	10.3	03.8	11.3	04.1	12.2	04.4	13.2	04.8	14.1	05.1	15.0	05.5	70
21	08 4	03.2	09.3	03.6	10.3	03.9	11.2	04.3	12.1	04.7	13.1	05.0	14.0	05.4	14.9	05.7	69
22	08 3	03.4	09.3	03.7	10.2	04.1	11.1	04.5	12.1	04.9	13.0	05.2	13.9	05.6	14.8	06.0	68
23	08 3	03.5	09.2	03.9	10.1	04.3	11.0	04.7	12.0	05.1	12.9	05.5	13.8	05.9	14.7	06.3	67
24	08.2	03.7	09.1	04.1	10.0	04.5	11.0	04.9	11.9	05.3	12.8	05.7	13.7	06.1	14.6	06.5	66
25	08 2	03.8	09.1	04.2	10.0	04.6	10 9	05.1	11.8	05.5	12.7	05.9	13.6	06.3	14.5	06.8	65
26	08 1	03.9	09.0	04.4	09.9	04.8	10.8	05.3	11.7	05.7	12.6	06.1	13.5	06.6	14.4	07.0	64
27	08.0	04.1	08.9	04.5	09.8	05.0	10.7	05.4	11.6	05.9	12.5	06.4	13.4	06.8	14.3	07.3	63
28	07.9	04.2	08.8	04.7	09.7	05 2	10.6	05.6	11.5	06.1	12.4	06.6	13.2	07.0	14.1	07.5	62
29	07.9	04.4	08.7	04.8	09.6	05.3	10.5	05.8	11.4	06.3	12.2	06.8	13.1	07.3	14.0	07.8	61
30	07.8	04.5	08.7	05.0	09.5	05.5	10.4	06.0	11.3	06.5	12.1	07.0	13.0	07.5	13.9	08.0	60
31	07.7	04.6	08.6	05.2	09.4	05.7	10.3	06.2	11.1	06.7	12.0	07.2	12.9	07.7	13.7	08.2	59
32	07.6	04.8	08.5	05.3	09.3	05.8	10.2	06.4	11.0	06.9	11.9	07.4	12.7	07.9	13.6	08.5	58
33	07.5	04.9	08.4	05.4	09.2	06.0	10.1	06.5	10.9	07.1	11.7	07.6	12.6	08.2	13.4	08.7	57
34	07.5	05.0	08.3	05.6	09.1	06.2	09.9	06.7	10.8	07.3	11.6	07.8	12.4	08.4	13.3	08.9	56
35	07.4	05.2	08.2	05.7	09.0	06.3	09.8	06.9	10.6	07.5	11.5	08.0	12.3	08.6	13.1	09.2	55
36	07.3	05.3	08.1	05.9	08.9	06.5	09.7	07 1	10.5	07.6	11.3	08.2	12.1	08.8	12.9	09.4	54
37	07.2	05.4	08.0	06.0	08.8	06.6	09.6	07.2	10.4	07.8	11.2	08.4	12.0	09.0	12.8	09.6	53
38	07.1	05.5	07.9	06.2	08.7	06.8	09.5	07.4	10.2	08 0	11.0	08.6	11.8	09.2	12.6	09.9	52
39	07.0	05.7	07.8	06.3	08 5	06.9	09.3	07.6	10.1	08.2	10.9	08.8	11.7	09.4	12 4	10.1	51
40	06.9	05.8	07.7	06.4	08.4	07.1	09.2	07.7	10.0	08.4	10.7	09.0	11.5	09.6	12.3	10.3	50
41	06.8	05.9	07.5	06.6	08.3	07.2	09.1	07.9	09.8	08.5	10.6	09.2	11.3	09.8	12.1	10.5	49
42	06.7	06.0	07.4	06.7	08.2	07.4	08.9	08.0	09.7	08.7	10.4	09.4	11.1	10.0	11.9	10.7	48
43	06.6	06.1	07.3	06.8	08.0	07.5	08.8	08.2	09.5	08.9	10.2	09.5	11.0	10.2	11.7	10.9	47
44	06.5	06.3	07.2	06.9	07.9	07.6	08.6	08.3	09.4	09.0	10.1	09.7	10.8	10.4	11.5	11.1	46
45	06.4	06.4	07.1	07.1	07.8	07.8	08.5	08.5	09.2	09.2	09.9	09.9	10.6	10.6	11.3	11.3	45
Dist.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep	Diff. Lat.	Dep.	Diff. Lat.	Dist.

Traverse Table.

Distance.	17		18		19		20		21		22		23		24		
Crse.	Diff Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Crse.
Pts.																	Pts.
¼	17.0	00.8	18.0	00.9	19 0	00.9	20.0	01.0	21.0	01.0	22.0	01.1	23.0	01.1	24.0	01.2	73¾
½	16.9	01.7	17.9	01.8	18.9	01.9	19.9	02.0	20.9	02.1	21.9	02.2	22.9	02.3	23.9	02.4	½
¾	16.9	02.5	17.8	02.6	18.8	02.8	19.8	02.9	20.8	03.1	21.8	03.2	22.7	03.4	23.7	03.5	¼
1	16.7	03.3	17.7	03.5	18.6	03.7	19.6	03.9	20.6	04.1	21.6	04.3	22.6	04.5	23.5	04.7	7
¼	16.5	04.1	17.5	04.4	18.4	04.6	19.4	04.9	20.4	05.1	21.3	05.3	22.3	05.6	23.3	05.8	¾
½	16.3	04.9	17.2	05.2	18.2	05.5	19.1	05.8	20.1	06.1	21.1	06.4	22.0	06.7	23.0	07.0	½
¾	16.0	05.7	17.0	06.1	17.9	06.4	18.8	06.7	19.8	07.1	20.7	07.4	21.7	07.7	22.6	08.1	¼
2	15.7	06.5	16.6	06.9	17.6	07.3	18.5	07.7	19.4	08.0	20.3	08.4	21.3	08.8	22.2	09.2	6
¼	15.4	07.3	16.3	07.7	17.2	08.1	18.1	08.6	19.0	09.0	19.9	09.4	20.8	09.8	21.7	10.3	¾
½	15.0	08.0	15.9	08.5	16.8	09.0	17.6	09.4	18.5	09.9	19.4	10.4	20.3	10.8	21.2	11.3	½
¾	14.6	08.7	15.4	09.3	16.3	09.8	17.2	10.3	18.0	10.8	18.9	11.3	19.7	11.8	20.6	12.3	¼
3	14.1	09.4	15.0	10.0	15.8	10.6	16.6	11.1	17.5	11.7	18.3	12.2	19.1	12.8	20.0	13.3	5
¼	13.7	10.1	14.5	10.7	15.3	11.3	16.1	11.9	16.9	12.5	17.7	13.1	18.5	13.7	19.3	14.3	¾
½	13.1	10.8	13.9	11.4	14.7	12.0	15.5	12.7	16.2	13.3	17.0	14.0	17.8	14.6	18.5	15.2	½
¾	12.6	11.4	13.3	12.1	14.1	12.8	14.8	13.4	15.6	14.1	16.3	14.8	17.0	15.4	17.8	16.1	¼
4	12.0	12.0	12.7	12.7	13.4	13.4	14.1	14.1	14.8	14.8	15.6	15.6	16.3	16.3	17.0	17.0	4
1°	17.0	00.3	18.0	00.3	19.0	00.3	20.0	00.3	21.0	00.4	22.0	00.4	23.0	00.4	24.0	00.4	89°
2	17.0	00.6	18.0	00.6	19.0	00.7	20.0	00.7	21.0	00.7	22.0	00.8	23.0	00.8	24.0	00.8	88
3	17.0	00.9	18.0	00.9	19.0	01.0	20.0	01.0	21.0	01.1	22.0	01.2	23.0	01.2	24.0	01.3	87
4	17.0	01.2	18.0	01.3	19.0	01.3	20.0	01.4	20.9	01.5	21.9	01.5	22.9	01.6	23.9	01.7	86
5	16.9	01.5	17.9	01.6	18.9	01.7	19.9	01.7	20.9	01.8	21.9	01.9	22.9	02.0	23.9	02.1	85
6	16.9	01.8	17.9	01.9	18.9	02.0	19.9	02.1	20.9	02.2	21.9	02.3	22.9	02.4	23.9	02.5	84
7	16.9	02.1	17.9	02.2	18.9	02.3	19.9	02.4	20.8	02.6	21.8	02.7	22.8	02.8	23.8	02.9	83
8	16.8	02.4	17.8	02.5	18.8	02.6	19.8	02.8	20.8	02.9	21.8	03.1	22.8	03.2	23.8	03.3	82
9	16.8	02.7	17.8	02.8	18.8	03.0	19.8	03.1	20.7	03.3	21.7	03.4	22.7	03.6	23.7	03.8	81
10	16.7	03.0	17.7	03.1	18.7	03.3	19.7	03.5	20.7	03.6	21.7	03.8	22.7	04.0	23.6	04.2	80
11	16.7	03.2	17.7	03.4	18.7	03.6	19.6	03.8	20.6	04.0	21.6	04.2	22.6	04.4	23.6	04.6	79
12	16.6	03.5	17.6	03.7	18.6	04.0	19.6	04.2	20.5	04.4	21.5	04.6	22.5	04.8	23.5	05.0	78
13	16.6	03.8	17.5	04.0	18.5	04.3	19.5	04.5	20.5	04.7	21.4	04.9	22.4	05.2	23.4	05.4	77
14	16.5	04.1	17.5	04.4	18.4	04.6	19.4	04.8	20.4	05.1	21.3	05.3	22.3	05.6	23.3	05.8	76
15	16.4	04.4	17.4	04.7	18.4	04.9	19.3	05.2	20.3	05.4	21.3	05.7	22.2	06.0	23.2	06.2	75
16	16.3	04.7	17.3	05.0	18.3	05.2	19.2	05.5	20.2	05.8	21.1	06.1	22.1	06.3	23.1	06.6	74
17	16.3	05.0	17.2	05.3	18.2	05.6	19.1	05.8	20.1	06.1	21.0	06.4	22.0	06.7	23.0	07.0	73
18	16.2	05.3	17.1	05.6	18.1	05.9	19.0	06.2	20.0	06.5	20.9	06.8	21.9	07.1	22.8	07.4	72
19	16.1	05.5	17.0	05.9	18.0	06.2	18.9	06.5	19.9	06.8	20.8	07.2	21.7	07.5	22.7	07.8	71
20	16.0	05.8	16.9	06.2	17.9	06.5	18.8	06.8	19.7	07.2	20.7	07.5	21.6	07.9	22.6	08.2	70
21	15.9	06.1	16.8	06.5	17.7	06.8	18.7	07.2	19.6	07.5	20.5	07.9	21.5	08.2	22.4	08.6	69
22	15.8	06.4	16.7	06.7	17.6	07.1	18.5	07.5	19.5	07.9	20.4	08.2	21.3	08.6	22.3	09.0	68
23	15.6	06.6	16.6	07.0	17.5	07.4	18.4	07.8	19.3	08.2	20.3	08.6	21.2	09.0	22.1	09.4	67
24	15.5	06.9	16.4	07.3	17.4	07.7	18.3	08.1	19.2	08.5	20.1	08.9	21.0	09.4	21.9	09.8	66
25	15.4	07.2	16.3	07.6	17.2	08.0	18.1	08.5	19.0	08.9	19.9	09.3	20.8	09.7	21.8	10.1	65
26	15.3	07.5	16.2	07.9	17.1	08.3	18.0	08.8	18.9	09.2	19.8	09.6	20.7	10.1	21.6	10.5	64
27	15.1	07.7	16.0	08.2	16.9	08.6	17.8	09.1	18.7	09.5	19.6	10.0	20.5	10.4	21.4	10.9	63
28	15.0	08.0	15.9	08.5	16.8	08.9	17.7	09.4	18.5	09.9	19.4	10.3	20.3	10.8	21.2	11.3	62
29	14.9	08.2	15.7	08.7	16.6	09.2	17.5	09.7	18.4	10.2	19.2	10.7	20.1	11.2	21.0	11.6	61
30	14.7	08.5	15.6	09.0	16.5	09.5	17.3	10.0	18.2	10.5	19.1	11.0	19.9	11.5	20.8	12.0	60
31	14.6	08.8	15.4	09.3	16.3	09.8	17.1	10.3	18.0	10.8	18.9	11.3	19.7	11.8	20.6	12.4	59
32	14.4	09.0	15.3	09.5	16.1	10.1	17.0	10.6	17.8	11.1	18.7	11.7	19.5	12.2	20.4	12.7	58
33	14.3	09.3	15.1	09.8	15.9	10.3	16.8	10.9	17.6	11.4	18.5	12.0	19.3	12.5	20.1	13.1	57
34	14.1	09.5	14.9	10.1	15.8	10.6	16.6	11.2	17.4	11.7	18.2	12.3	19.1	12.9	19.9	13.4	56
35	13.9	09.8	14.7	10.3	15.6	10.9	16.4	11.5	17.2	12.0	18.0	12.6	18.8	13.2	19.7	13.8	55
36	13.8	10.0	14.6	10.6	15.4	11.2	16.2	11.8	17.0	12.3	17.8	12.9	18.6	13.5	19.4	14.1	54
37	13.6	10.2	14.4	10.8	15.2	11.4	16.0	12.0	16.8	12.6	17.6	13.2	18.4	13.8	19.2	14.4	53
38	13.4	10.5	14.2	11.1	15.0	11.7	15.8	12.3	16.5	12.9	17.3	13.5	18.1	14.2	18.9	14.8	52
39	13.2	10.7	14.0	11.3	14.8	12.0	15.5	12.6	16.3	13.2	17.1	13.8	17.9	14.5	18.7	15.1	51
40	13.0	10.9	13.8	11.6	14.6	12.2	15.3	12.9	16.1	13.5	16.9	14.1	17.6	14.8	18.4	15.4	50
41	12.8	11.2	13.6	11.8	14.3	12.5	15.1	13.1	15.8	13.8	16.6	14.4	17.4	15.1	18.1	15.7	49
42	12.6	11.4	13.4	12.0	14.1	12.7	14.9	13.4	15.6	14.1	16.3	14.7	17.1	15.4	17.8	16 1	48
43	12.4	11.6	13.2	12.3	13.9	13.0	14.6	13.6	15.4	14.3	16.1	15.0	16.8	15.7	17.6	16.4	47
44	12.2	11.8	12.9	12.5	13 7	13.2	14.4	13.9	15.1	14.6	15.8	15.3	16.5	16.0	17.3	16.7	46
45	12.0	12.0	12.7	12.7	13.4	13.4	14.1	14.1	14.8	14.8	15.6	15.6	16.3	16.3	17.0	17.0	45
Crse	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Crse.

Traverse Table.

Distance	25		26		27		28		29		30		31		32		Distance
Course	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Course
Pts.																	Pts.
¼	25.0	01.2	26.0	01.3	27.0	01.3	28.0	01.4	29.0	01.4	30.0	01.5	31.0	01.5	32.0	01.6	7¾
½	24.9	02.4	25.9	02.5	26.9	02.6	27.9	02.7	28.9	02.8	29.9	02.9	30.9	03.0	31.8	03.1	½
¾	24.7	03.7	25.7	03.8	26.7	04.0	27.7	04.1	28.7	04.3	29.7	04.4	30.7	04.5	31.7	04.7	¼
1	24.5	04.9	25.5	05.1	26.5	05.3	27.5	05.5	28.4	05.7	29.4	05.9	30.4	06.0	31.4	06.2	7
¼	24.3	06.1	25.2	06.3	26.2	06.6	27.2	06.8	28.1	07.0	29.1	07.3	30.1	07.5	31.0	07.8	¾
½	23.9	07.3	24.9	07.5	25.8	07.8	26.8	08.1	27.8	08.4	28.7	08.7	29.7	09.0	30.6	09.3	½
¾	23.5	08.4	24.5	08.8	25.4	09.1	26.4	09.4	27.3	09.8	28.2	10.1	29.2	10.4	30.1	10.8	¼
2	23.1	09.6	24.0	10.0	24.9	10.3	25.9	10.7	26.8	11.1	27.7	11.5	28.6	11.9	29.6	12.2	6
¼	22.6	10.7	23.5	11.1	24.4	11.5	25.3	12.0	26.2	12.4	27.1	12.8	28.0	13.3	28.9	13.7	¾
½	22.1	11.8	22.9	12.3	23.8	12.7	24.7	13.2	25.6	13.7	26.5	14.1	27.3	14.6	28.2	15.1	½
¾	21.4	12.9	22.3	13.4	23.2	13.9	24.0	14.4	24.9	14.9	25.7	15.4	26.6	15.9	27.4	16.4	¼
3	20.8	13.9	21.6	14.4	22.4	15.0	23.3	15.6	24.1	16.1	24.9	16.7	25.8	17.2	26.6	17.8	5
¼	20.1	14.9	20.9	15.5	21.7	16.1	22.5	16.7	23.3	17.3	24.1	17.9	24.9	18.5	25.7	19.1	¾
½	19.3	15.9	20.1	16.5	20.9	17.1	21.6	17.8	22.4	18.4	23.2	19.0	24.0	19.7	24.7	20.3	½
¾	18.5	16.8	19.3	17.5	20.0	18.1	20.7	18.8	21.5	19.5	22.2	20.1	23.0	20.8	23.7	21.5	¼
4	17.7	17.7	18.4	18.4	19.1	19.1	19.8	19.8	20.5	20.5	21.2	21.2	21.9	21.9	22.6	22.6	4
1°	25.0	00.4	26.0	00.5	27.0	00.5	28.0	00.5	29.0	00.5	30.0	00.5	31.0	00.5	32.0	00.6	89°
2	25.0	00.9	26.0	00.9	27.0	00.9	28.0	01.0	29.0	01.0	30.0	01.0	31.0	01.1	32.0	01.1	88
3	25.0	01.3	26.0	01.4	27.0	01.4	28.0	01.5	29.0	01.5	30.0	01.6	31.0	01.6	32.0	01.7	87
4	24.9	01.7	25.9	01.8	26.9	01.9	27.9	02.0	28.9	02.0	29.9	02.1	30.9	02.2	31.9	02.2	86
5	24.9	02.2	25.9	02.3	26.9	02.4	27.9	02.4	28.9	02.5	29.9	02.6	30.9	02.7	31.9	02.8	85
6	24.9	02.6	25.9	02.7	26.9	02.8	27.8	02.9	28.8	03.0	29.8	03.1	30.8	03.2	31.8	03.3	84
7	24.8	03.0	25.8	03.2	26.8	03.3	27.8	03.4	28.8	03.5	29.8	03.7	30.8	03.8	31.8	03.9	83
8	24.8	03.5	25.7	03.6	26.7	03.8	27.7	03.9	28.7	04.0	29.7	04.2	30.7	04.3	31.7	04.5	82
9	24.7	03.9	25.7	04.1	26.7	04.2	27.7	04.4	28.6	04.5	29.6	04.7	30.6	04.8	31.6	05.0	81
10	24.6	04.3	25.6	04.5	26.6	04.7	27.6	04.9	28.6	05.0	29.5	05.2	30.5	05.4	31.5	05.6	80
11	24.5	04.8	25.5	05.0	26.5	05.2	27.5	05.3	28.5	05.5	29.4	05.7	30.4	05.9	31.4	06.1	79
12	24.5	05.2	25.4	05.4	26.4	05.6	27.4	05.8	28.4	06.0	29.3	06.2	30.3	06.4	31.3	06.7	78
13	24.4	05.6	25.3	05.8	26.3	06.1	27.3	06.3	28.3	06.5	29.2	06.7	30.2	07.0	31.2	07.2	77
14	24.3	06.0	25.2	06.3	26.2	06.5	27.2	06.8	28.1	07.0	29.1	07.3	30.1	07.5	31.0	07.7	76
15	24.1	06.5	25.1	06.7	26.1	07.0	27.0	07.2	28.0	07.5	29.0	07.8	29.9	08.0	30.9	08.3	75
16	24.0	06.9	25.0	07.2	26.0	07.4	26.9	07.7	27.9	08.0	28.8	08.3	29.8	08.5	30.8	08.8	74
17	23.9	07.3	24.9	07.6	25.8	07.9	26.8	08.2	27.7	08.5	28.7	08.8	29.6	09.1	30.6	09.4	73
18	23.8	07.7	24.7	08.0	25.7	08.3	26.6	08.7	27.6	09.0	28.5	09.3	29·5	09.6	30.4	09.9	72
19	23.6	08.1	24.6	08.5	25.5	08.8	26.5	09.1	27.4	09.4	28.4	09.8	29.3	10.1	30.3	10.4	71
20	23.5	08.6	24.4	08.9	25.4	09.2	26.3	09.6	27.3	09.9	28.2	10.3	29.1	10.6	30.1	10.9	70
21	23·3	09.0	24.3	09.3	25.2	09.7	26.1	10.0	27.1	10.4	28.0	10.8	28.9	11.1	29.9	11.5	69
22	23.2	09.4	24.1	09.7	25.0	10.1	26.0	10.5	26.9	10.9	27.8	11.2	28.7	11.6	29.7	12.0	68
23	23.0	09.8	23.9	10.2	24.9	10.5	25.8	10.9	26.7	11.3	27.6	11.7	28.5	12·1	29.5	12.5	67
24	22.8	10.2	23.8	10.6	24.7	11.0	25.6	11.4	26.5	11.8	27.4	12.2	28.3	12.6	29.2	13.0	66
25	22.7	10.6	23.6	11.0	24.5	11.4	25.4	11.8	26.3	12.3	27.2	12.7	28.1	13.1	29.0	13.5	65
26	22.5	11.0	23.4	11.4	24.3	11.8	25.2	12.3	26.1	12.7	27.0	13.2	27.9	13.6	28.8	14.0	64
27	22.3	11.3	23.2	11.8	24.1	12.3	24.9	12.7	25.8	13.2	26.7	13.6	27.6	14.1	28.5	14.5	63
28	22.1	11.7	23.0	12.2	23.8	12.7	24.7	13.1	25.6	13.6	26.5	14.1	27.4	14.6	28.3	15.0	62
29	21.9	12.1	22.7	12.6	23.6	13.1	24.5	13.6	25.4	14.1	26.2	14.5	27.1	15.0	28.0	15.5	61
30	21.7	12.5	22.5	13.0	23.4	13.5	24.2	14.0	25.1	14.5	26.0	15.0	26.8	15.5	27.7	16.0	60
31	21.4	12.9	22.3	13.4	23.1	13.9	24.0	14.4	24.9	14.9	25.7	15.5	26.6	16.0	27.4	16.5	59
32	21.2	13.2	22.0	13.8	22.9	14.3	23.7	14.8	24.6	15.4	25.4	15.9	26.3	16.4	27.1	17.0	58
33	21.0	13.6	21.8	14.2	22.6	14.7	23.5	15.2	24.3	15.8	25.2	16.3	26.0	16.9	26.8	17.4	57
34	20.7	14.0	21.6	14.5	22.4	15.1	23.2	15.7	24.0	16.2	24.9	16.8	25.7	17.3	26.5	17.9	56
35	20.5	14.3	21.3	14.9	22.1	15.5	22.9	16.1	23.8	16.6	24.6	17.2	25.4	17.8	26.2	18.4	55
36	20.2	14.7	21.0	15.3	21.8	15.9	22.7	16.5	23.5	17.0	24.3	17.6	25.1	18.2	25.9	18.8	54
37	20.0	15.0	20.8	15.6	21.6	16.2	22.4	16.9	23.2	17.5	24.0	18.1	24.8	18.7	25.6	19.3	53
38	19.7	15.4	20.5	16.0	21.3	16.6	22.1	17.2	22.9	17.9	23.6	18.5	24.4	19.1	25.2	19.7	52
39	19.4	15.7	20.2	16.4	21.0	17.0	21.8	17.6	22.5	18.3	23.3	18.9	24.1	19.5	24.9	20.1	51
40	19.2	16.1	19.9	16.7	20.7	17.4	21.4	18.0	22.2	18.6	23.0	19.3	23.7	19.9	24.5	20.6	50
41	18.9	16.4	19.6	17.1	20.4	17.7	21.1	18.4	21.9	19.0	22.6	19.7	23.4	20.3	24.2	21.0	49
42	18.6	16.7	19.3	17.4	20.1	18.1	20.8	18.7	21.6	19.4	22 3	20.1	23.0	20.7	23.8	21.4	48
43	18.3	17.0	19.0	17.7	19.7	18.4	20.5	19.1	21.2	19.8	21.9	20.5	22.7	21.1	23.4	21.8	47
44	18.0	17.4	18.7	18.1	19.4	18.8	20.1	19.5	20.9	20.1	21.6	20.8	22.3	21.5	23.0	22.2	46
45	17.7	17.7	18.4	18.4	19.1	19.1	19.8	19.8	20.5	20.5	21.2	21.2	21.9	21.9	22.6	22.6	45
Course	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Course

Traverse Table.

Distance.	33		34		35		36		37		38		39		40		
Cmse.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Cmse.
Pts.																	Pts.
¼	33.0	01.6	34.0	01.7	35.0	01.7	36.0	01.8	37.0	01.8	38.0	01.9	39.0	01.9	40.0	02.0	¼
½	32.8	03.2	33.8	03.3	34.8	03.4	35.8	03.5	36.8	03.6	37.8	03.7	38.8	03.8	39.8	03.9	½
¾	32.6	04.8	33.6	05.0	34.6	05.1	35.6	05.3	36.6	05.4	37.6	05.6	38.6	05.7	39.6	05.9	¾
1	32.4	06.4	33.3	06.6	34.3	06.8	35.3	07.0	36.3	07.2	37.3	07.4	38.2	07.6	39.2	07.8	7
¼	32.0	08.0	33.0	08.3	34.0	08.5	34.9	08.7	35.9	09.0	36.9	09.2	37.8	09.5	38.8	09.7	¼
½	31.6	09.6	32.5	09.9	33.5	10.2	34.5	10.4	35.4	10.7	36.4	11.0	37.3	11.3	38.3	11.6	½
¾	31.1	11.1	32.0	11.5	33.0	11.8	33.9	12.1	34.8	12.5	35.8	12.8	36.7	13.1	37.7	13.5	¾
2	30.5	12.6	31.4	13.0	32.3	13.4	33.3	13.8	34.2	14.2	35.1	14.5	36.0	14.9	37.0	15.3	6
¼	29.8	14.1	30.7	14.5	31.6	15.0	32.5	15.4	33.4	15.8	34.4	16.2	35.3	16.7	36.2	17.1	¼
½	29.1	15.6	30.0	16.0	30.9	16.5	31.8	17.0	32.6	17.4	33.5	17.9	34.4	18.4	35.3	18.9	½
¾	28.3	17.0	29.2	17.5	30.0	18.0	30.9	18.5	31.7	19.0	32.6	19.5	33.5	20.0	34.3	20.6	¾
3	27.4	18.3	28.3	18.9	29.1	19.4	29.9	20.0	30.8	20.6	31.6	21.1	32.4	21.7	33.3	22.2	5
¼	26.5	19.7	27.3	20.3	28.1	20.9	28.9	21.4	29.7	22.0	30.5	22.6	31.3	23.2	32.1	23.8	¼
½	25.5	20.9	26.3	21.6	27.1	22.2	27.8	22.8	28.6	23.5	29.4	24.1	30.1	24.7	30.9	25.4	½
¾	24.4	22.2	25.2	22.8	25.9	23.5	26.7	24.2	27.4	24.8	28.2	25.5	28.9	26.2	29.6	26.9	¾
4	23.3	23.3	24.0	24.0	24.7	24.7	25.5	25.5	26.2	26.2	26 9	26.9	27.6	27.6	28.3	28.3	4
1°	33.0	00.6	34.0	00.6	35.0	00.6	36.0	00.6	37.0	00.6	38.0	00.7	39.0	00.7	40.0	00.7	89°
2	33.0	01.2	34.0	01.2	35.0	01.2	36.0	01.3	37.0	01.3	38.0	01.3	39.0	01.4	40.0	01.4	88
3	33.0	01.7	34.0	01.8	35.0	01.8	36.0	01.9	36.9	01.9	37.9	02.0	38.9	02.0	39.9	02.1	87
4	32.9	02.3	33.9	02.4	34.9	02.4	35.9	02.5	36.9	02.6	37.9	02.7	38.9	02.7	39.9	02.8	86
5	32.9	02.9	33.9	03.0	34.9	03.1	35.9	03.1	36.9	03.2	37.9	03.3	38.9	03.4	39.8	03.5	85
6	32.8	03.4	33.8	03.6	34.8	03.7	35.8	03.8	36.8	03.9	37.8	04.0	38.8	04.1	39.8	04.2	84
7	32.8	04.0	33.7	04.1	34.7	04.3	35.7	04.4	36.7	04.5	37.7	04.6	38.7	04.8	39.7	04.9	83
8	32.7	04.6	33.7	04.7	34.7	04.9	35.6	05.0	36.6	05.1	37.6	05.3	38.6	05.4	39.6	05.6	82
9	32.6	05.2	33·6	05.3	34.6	05.5	35.6	05.6	36.5	05.8	37.5	05.9	38.5	06.1	39.5	06.3	81
10	32.5	05.7	33.5	05.9	34.5	06.1	35.5	06.3	36.4	06.4	37.4	06.6	38.4	06.8	39.4	06.9	80
11	32.4	06.3	33.4	06.5	34.4	06.7	35.3	06.9	36.3	07.1	37.3	07.3	38.3	07.4	39.3	07.6	79
12	32.3	06.9	33.3	07.1	34.2	07.3	35.2	07.5	36.2	07.7	37.2	07.9	38.1	08.1	39.1	08.3	78
13	32.2	07.4	33.1	07.6	34.1	07.9	35.1	08.1	36.1	08.3	37.0	08.5	38.0	08.8	39.0	09.0	77
14	32.0	08.0	33.1	08.2	34.0	08.5	34.9	08.7	35.9	09.0	36.9	09.2	37.8	09.4	38.8	09.7	76
15	31.9	08.5	32.8	08.8	33.8	09.1	34.8	09.3	35.7	09.6	36.7	09.8	37.7	10.1	38.6	10.4	75
16	31.7	09.1	32.7	09.4	33.6	09.6	34.6	09.9	35.6	10.2	36.5	10.5	37.5	10.7	38.5	11.0	74
17	31.6	09.6	32.5	09.9	33.5	10.2	34.4	10.5	35.4	10.8	36.3	11.1	37.3	11.4	38.3	11.7	73
18	31.4	10.2	32.3	10.5	33.3	10.8	34.2	11.1	35.2	11.4	36.1	11.7	37.1	12.1	38.0	12.4	72
19	31 2	10.7	32.1	11.1	33.1	11.4	34.0	11.7	35.0	12.0	35.9	12.4	36 9	12.7	37.8	13.0	71
20	31.0	11.3	31.9	11.6	32.9	12.0	33.8	12.3	34.8	12.7	35.7	13.0	36.6	13.3	37.6	13.7	70
21	30.8	11.8	31.7	12.2	32.7	12.5	33.6	12.9	34.5	13.3	35.5	13.6	36.4	14.0	37.3	14.3	69
22	30.6	12.4	31.5	12.7	32.5	13.1	33.4	13.5	34.3	13.9	35.2	14.2	36.2	14.6	37.1	15.0	68
23	30.4	12.9	31.3	13.3	32.2	13.7	33.1	14.1	34.1	14.5	35.0	14.8	35.9	15.2	36.8	15.6	67
24	30.1	13.4	31.1	13.8	32.0	14.2	32.9	14.6	33.8	15.0	34.7	15.5	35.6	15.9	36.5	16.3	66
25	29.9	13 9	30.8	14.4	31.7	14.8	32.6	15.2	33.5	15.6	34.4	16.1	35.3	16.5	36.3	16.9	65
26	29.7	14.5	30.6	14.9	31.5	15.3	32.4	15.8	33.3	16.2	34.2	16.7	35.1	17.1	36.0	17.5	64
27	29.4	15.0	30.3	15.4	31.2	15.9	32.1	16.3	33.0	16.8	33.9	17.3	34.7	17.7	35.6	18.2	63
28	29.1	15 5	30.0	16.0	30.9	16.4	31.8	16.9	32.7	17.4	33.6	17.8	34.4	18.3	35.3	18.8	62
29	28.9	16.0	29.7	16.5	30.6	17.0	31.5	17.5	32.4	17.9	33.2	18.4	34.1	18.9	35.0	19.4	61
30	28.6	16.5	29.4	17.0	30 3	17.5	31.2	18.0	32.0	18.5	32.9	19.0	33.8	19.5	34.6	20.0	60
31	28.3	17.0	29.1	17.5	30.0	18.0	30.9	18.5	31.7	19.1	32.6	19.6	33.4	20.1	34.3	20.6	59
32	28.0	17.5	28.8	18.0	29.7	18.5	30.5	19.1	31.4	19.6	32.2	20.1	33.1	20.7	33.9	21.2	58
33	27.7	18.0	28.5	18.5	29.4	19.1	30.2	19.6	31.0	20.2	31.9	20.7	32.7	21.2	33.5	21.8	57
34	27.4	18.5	28.2	19.0	29.0	19.6	29.8	20.1	30.7	20.7	31.5	21.2	32.3	21.8	33.2	22.4	56
35	27.0	18.9	27.9	19.5	28.7	20.1	29.5	20.6	30.3	21.2	31.1	21.8	31.9	22.4	32.8	22.9	55
36	26.7	19.4	27.5	20.0	28.3	20.6	29.1	21.2	29.9	21.7	30.7	22.3	31.6	22.9	32.4	23.5	54
37	26.4	19.9	27.2	20.5	28.0	21.1	28.8	21.7	29.5	22.3	30.3	22.9	31.1	23.5	31.9	24.1	53
38	26.0	20.3	26.8	20.9	27.6	21.5	28.4	22.2	29.2	22.8	29.9	23.4	30.7	24.0	31 5	24.6	52
39	25.6	20.8	26 4	21.4	27.2	22.0	28.0	22.7	28.8	23.3	29.5	23.9	30.3	24.5	31.1	25.2	51
40	25.3	21.2	26.0	21.9	26.8	22.5	27.6	23.1	28.3	23.8	29.1	24.4	29.9	25.1	30.6	25 7	50
41	24.9	21.6	25.7	22.3	26.4	23.0	27.2	23.6	27.9	24.3	28:7	24.9	29.4	25.6	30.2	26.2	49
42	24.5	22.1	25.3	22.8	26.0	23.4	26.8	24.1	27.5	24.8	28.2	25.4	29.0	26.1	29 7	26.8	48
43	24.1	22.5	24.9	23.2	25.6	23.9	26.3	24.6	27.1	25.2	27.8	25.9	28.5	26.6	29.3	27.3	47
44	23.7	22.9	24.5	23.6	25.2	24.3	25.9	25.0	26.6	25.7	27.3	26.4	28.1	27.1	28.8	27.8	46
45	23.3	23.3	24.0	24.0	24.7	24.7	25.5	25.5	26.2	26.2	26.9	26.9	27.6	27.6	28.3	28.3	45
Cmse.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Cmse.

Traverse Table.

Diamn.	41		42		43		44		45		46		47		48		
Cmn	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat	Dep.	Diff.Lat	Dep.	Cmn
Pts.																	Pts.
¼	41.0	02.0	41.9	02.1	42.9	02.1	43.9	02.2	44.9	02.2	45.9	02.3	46.9	02.3	47.9	02.4	75 ¼
½	40.8	04.0	41.8	04.1	42.8	04.2	43.8	04.3	44.8	04.4	45.8	04.5	46.8	04.6	47.8	04.7	½
¾	40.6	06.0	41.5	06.2	42.5	06.3	43.5	06.5	44.5	06.6	45.5	06.7	46.5	06.9	47.5	07.0	¾
1	40.2	08.0	41.2	08.2	42.2	08.4	43.2	08.6	44.1	08.8	45.1	09.0	46.1	09.2	47.1	09.4	7
¼	39.8	10.0	40.7	10.2	41.7	10.4	42.7	10.7	43.7	10.9	44.6	11.2	45.6	11.4	46.6	11.7	¼
½	39.2	11.9	40.2	12.2	41.2	12.5	42.1	12.8	43.1	13.1	44.0	13.3	45.0	13.6	45.9	13.9	½
¾	38.6	13.8	39.5	14.1	40.5	14.5	41.4	14.8	42.4	15.2	43.3	15.5	44.3	15.8	45.2	16.2	¾
2	37.9	15.7	38.8	16.1	39.7	16.5	40.6	16.8	41.6	17.2	42.5	17.6	43.4	18.0	44.4	18.4	6
¼	37.1	17.5	38.0	18.0	38.9	18.4	39.8	18.8	40.7	19.2	41.6	19.7	42.5	20.1	43.4	20.5	¼
½	36.2	19.3	37.0	19.8	37.9	20.3	38.8	20.7	39.7	21.2	40.6	21.7	41.5	22.2	42.3	22.6	½
¾	35.2	21.1	36.0	21.6	36.9	22.1	37.7	22.6	38.6	23.1	39.5	23.6	40.3	24.2	41.2	24.7	¾
3	34.1	22.8	34.9	23.3	35.8	23.9	36.6	24.4	37.4	25.0	38.2	25.6	39.1	26.1	39.9	26.7	5
¼	32.9	24.4	33.7	25.0	34.5	25.6	35.3	26.2	36.1	26.8	36.9	27.4	37.7	28.0	38.6	28.6	¼
½	31.7	26.0	32.5	26.6	33.2	27.3	34.0	27.9	34.8	28.5	35.6	29.2	36.3	29.8	37.1	30.4	½
¾	30.4	27.5	31.1	28.2	31.9	28.9	32.6	29.5	33.3	30.2	34.1	30.9	34.8	31.6	35.6	32.2	¾
4	29.0	29.0	29.7	29.7	30.4	30.4	31.1	31.1	31.8	31.8	32.5	32.5	33.2	33.2	33.9	33.9	4
1°	41.0	00.7	42.0	00.7	43.0	00.8	44.0	00.8	45.0	00.8	46.0	00.8	47.0	00.8	48.0	00.8	89°
2	41.0	01.4	42.0	01.5	43.0	01.5	44.0	01.5	45.0	01.6	46.0	01.6	47.0	01.6	48.0	01.7	88
3	40.9	02.1	41.9	02.2	42.9	02.3	43.9	02.3	44.9	02.4	45.9	02.4	46.9	02.5	47.9	02.5	87
4	40.9	02.9	41.9	02.9	42.9	03.0	43.9	03.1	44.9	03.1	45.9	03.2	46.9	03.3	47.9	03.3	86
5	40.8	03.6	41.8	03.7	42.8	03.7	43.8	03.8	44.8	03.9	45.8	04.0	46.8	04.1	47.8	04.2	85
6	40.8	04.3	41.8	04.4	42.8	04.5	43.8	04.6	44.8	04.7	45.7	04.8	46.7	04.9	47.7	05.0	84
7	40.7	05.0	41.7	05.1	42.7	05.2	43.7	05.4	44.7	05.5	45.7	05.6	46.6	05.7	47.6	05.8	83
8	40.6	05.7	41.6	05.8	42.6	06.0	43.6	06.1	44.6	06.3	45.6	06.4	46.5	06.5	47.5	06.7	82
9	40.5	06.4	41.5	06.6	42.5	06.7	43.5	06.9	44.4	07.0	45.4	07.2	46.4	07.4	47.4	07.5	81
10	40.4	07.1	41.4	07.3	42.3	07.5	43.3	07.6	44.3	07.8	45.3	08.0	46.3	08.2	47.3	08.3	80
11	40.2	07.8	41.2	08.0	42.2	08.2	43.2	08.4	44.2	08.6	45.2	08.8	46.1	09.0	47.1	09.2	79
12	40.1	08.5	41.1	08.7	42.1	08.9	43.0	09.1	44.0	09.4	45.0	09.6	46.0	09.8	47.0	10.0	78
13	39.9	09.2	40.9	09.4	41.9	09.7	42.9	09.9	43.8	10.1	44.8	10.3	45.8	10.6	46.8	10.8	77
14	39.8	09.9	40.8	10.2	41.7	10.4	42.7	10.6	43.7	10.9	44.6	11.1	45.6	11.4	46.6	11.6	76
15	39.6	10.6	40.6	10.9	41.5	11.1	42.5	11.4	43.5	11.6	44.4	11.9	45.4	12.2	46.4	12.4	75
16	39.4	11.3	40.4	11.6	41.3	11.9	42.3	12.1	43.3	12.4	44.2	12.7	45.2	13.0	46.1	13.2	74
17	39.2	12.0	40.2	12.3	41.1	12.6	42.1	12.9	43.0	13.2	44.0	13.4	44.9	13.7	45.9	14.0	73
18	39.0	12.7	39.9	13.0	40.9	13.3	41.8	13.6	42.8	13.9	43.7	14.2	44.7	14.5	45.7	14.8	72
19	38.8	13.3	39.7	13.7	40.7	14.0	41.6	14.3	42.5	14.7	43.5	15.0	44.4	15.3	45.4	15.6	71
20	38.5	14.0	39.5	14.4	40.4	14.7	41.3	15.0	42.3	15.4	43.2	15.7	44.2	16.1	45.1	16.4	70
21	38.3	14.7	39.2	15.1	40.1	15.4	41.1	15.8	42.0	16.1	42.9	16.5	43.9	16.8	44.8	17.2	69
22	38.0	15.4	38.9	15.7	39.9	16.1	40.8	16.5	41.7	16.9	42.7	17.2	43.6	17.6	44.5	18.0	68
23	37.7	16.0	38.7	16.4	39.6	16.8	40.5	17.2	41.4	17.6	42.3	18.0	43.3	18.4	44.2	18.8	67
24	37.5	16.7	38.4	17.1	39.3	17.5	40.2	17.9	41.1	18.3	42.0	18.7	42.9	19.1	43.9	19.5	66
25	37.2	17.3	38.1	17.7	39.0	18.2	39.9	18.6	40.8	19.0	41.7	19.4	42.6	19.9	43.5	20.3	65
26	36.9	18.0	37.7	18.4	38.6	18.8	39.5	19.3	40.4	19.7	41.3	20.2	42.2	20.6	43.1	21.0	64
27	36.5	18.6	37.4	19.1	38.3	19.5	39.2	20.0	40.1	20.4	41.0	20.9	41.9	21.3	42.8	21.8	63
28	36.2	19.2	37.1	19.7	38.0	20.2	38.8	20.7	39.7	21.1	40.6	21.6	41.5	22.1	42.4	22.5	62
29	35.9	19.9	36.7	20.4	37.6	20.8	38.5	21.3	39.4	21.8	40.2	22.3	41.1	22.8	42.0	23.3	61
30	35.5	20.5	36.4	21.0	37.2	21.5	38.1	22.0	39.0	22.5	39.8	23.0	40.7	23.5	41.6	24.0	60
31	35.1	21.1	36.0	21.6	36.9	22.1	37.7	22.7	38.6	23.2	39.4	23.7	40.3	24.2	41.1	24.7	59
32	34.8	21.7	35.6	22.3	36.5	22.8	37.3	23.3	38.2	23.8	39.0	24.4	39.9	24.9	40.7	25.4	58
33	34.4	22.3	35.2	22.9	36.1	23.4	36.9	24.0	37.7	24.5	38.6	25.1	39.4	25.6	40.3	26.1	57
34	34.0	22.9	34.8	23.5	35.6	24.0	36.5	24.6	37.3	25.2	38.1	25.7	39.0	26.3	39.8	26.8	56
35	33.6	23.5	34.4	24.1	35.2	24.7	36.0	25.2	36.9	25.8	37.7	26.4	38.5	27.0	39.3	27.5	55
36	33.2	24.1	34.0	24.7	34.8	25.3	35.6	25.9	36.4	26.5	37.2	27.0	38.0	27.6	38.8	28.2	54
37	32.7	24.7	33.5	25.3	34.3	25.9	35.1	26.5	35.9	27.1	36.7	27.7	37.5	28.3	38.3	28.9	53
38	32.3	25.2	33.1	25.9	33.9	26.5	34.7	27.1	35.5	27.7	36.2	28.3	37.0	28.9	37.8	29.6	52
39	31.9	25.8	32.6	26.4	33.4	27.1	34.2	27.7	35.0	28.3	35.7	28.9	36.5	29.6	37.3	30.2	51
40	31.4	26.4	32.2	27.0	32.9	27.6	33.7	28.3	34.5	28.9	35.2	29.6	36.0	30.2	36.8	30.9	50
41	30.9	26.9	31.7	27.6	32.5	28.2	33.2	28.9	34.0	29.5	34.7	30.2	35.5	30.8	36.2	31.5	49
42	30.5	27.4	31.2	28.1	32.0	28.8	32.7	29.4	33.4	30.1	34.2	30.8	34.9	31.4	35.7	32.1	48
43	30.0	28.0	30.7	28.6	31.4	29.3	32.2	30.0	32.9	30.7	33.6	31.4	34.4	32.1	35.1	32.7	47
44	29.5	28.5	30.2	29.2	30.9	29.9	31.7	30.6	32.4	31.3	33.1	32.0	33.8	32.6	34.5	33.3	46
45	29.0	29.0	29.7	29 7	30.4	30.4	31.1	31.1	31.8	31.8	32.5	32.5	33.2	33.2	33.9	33.9	45
Cmn	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat	Dep.	Diff.Lat.	Cmn.

Traverse Table.

Dist.	49		50		51		52		53		54		55		56		Dist.
Crse.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Crse.
Pts.																	Pts.
¼	48.9	02.4	49.9	02.5	50.9	02.5	51.9	02.6	52.9	02.6	53.9	02.7	54.9	02.7	55 9	02.8	¼
½	48.8	04.8	49.8	04.9	50.8	05.0	51.7	05.1	52.7	05.2	53.7	05.3	54.7	05.4	55.7	05.5	½
¾	48.5	07.2	49.5	07.3	50.4	07.5	51.4	07.6	52.4	07.8	53.4	07.9	54.4	08.1	55.4	08.2	¾
1	48.1	09.6	49.0	09.8	50.0	10.0	51.0	10.1	52.0	10.3	53.0	10.5	53.9	10.7	54.9	10.9	7
¼	47.5	11.9	48.5	12.2	49.5	12.4	50.4	12.6	51.4	12.9	52.4	13.1	53.4	13.4	54.3	13.6	¼
½	46.9	14.2	47.9	14.5	48.8	14.8	49.8	15.1	50.7	15.4	51.7	15.7	52.6	16.0	53.6	16.3	½
¾	46.1	16.5	47.1	16.8	48.0	17.2	49.0	17.5	49.9	17.9	50.8	18.2	51.8	18.5	52.7	18.9	¾
2	45.3	18.8	46.2	19.1	47.1	19.5	48.0	19.9	49.0	20.3	49.9	20.7	50.8	21.0	51.7	21.4	6
¼	44.3	21.0	45.2	21.4	46.1	21.8	47.0	22.2	47.9	22.7	48.8	23.1	49.7	23.5	50.6	23.9	¼
½	43.2	23.1	44.1	23.6	45.0	24.0	45.9	24.5	46.7	25.0	47.6	25.5	48.5	25.9	49.4	26.4	½
¾	42.0	25.2	42.9	25.7	43.7	26.2	44.6	26.7	45.5	27.2	46.3	27.8	47.2	28.3	48.0	28.8	¾
3	40.7	27.2	41.6	27.8	42.4	28.3	43.2	28.9	44.1	29.4	44.9	30.0	45.7	30.6	46.6	31.1	5
¼	39.4	29.2	40.2	29.8	41.0	30.4	41.8	31.0	42.6	31.6	43.4	32.2	44.2	32.8	45.0	33.4	¼
½	37.9	31.1	38.6	31.7	39.4	32.3	40.2	33.0	41.0	33.6	41.7	34.3	42.5	34.9	43.3	35.5	½
¾	36.3	32.9	37.0	33.6	37.8	34.2	38.5	34.9	39.3	35.6	40.0	36.3	40.7	36.9	41.5	37.6	¾
4	34.6	34.6	35.4	35.4	36.1	36.1	36.8	36.8	37.5	37.5	38.2	38.2	38.9	38.9	39.6	39.6	4
1°	49.0	00.9	50.0	00.9	51.0	00.9	52.0	00.9	53.0	00.9	54.0	00.9	55.0	01.0	56.0	01.0	89°
2	49.0	01.7	50.0	01.7	51.0	01.8	52.0	01.8	53.0	01.8	54.0	01.9	55.0	01.9	56.0	02.0	88
3	48.9	02.6	49.9	02.6	50.9	02.7	51.9	02.7	52.9	02.8	53.9	02.8	54.9	02.9	55.9	02.9	87
4	48.9	03.4	49.9	03.5	50.9	03.6	51.9	03.6	52.9	03.7	53.9	03.8	54.9	03.8	55.9	03.9	86
5	48.8	04.3	49.8	04.4	50.8	04.4	51.8	04.5	52.8	04.6	53.8	04.7	54.8	04.8	55.8	04.9	85
6	48.7	05.1	49.7	05.2	50.7	05.3	51.7	05.4	52.7	05.5	53.7	05.6	54.7	05.7	55.7	05.9	84
7	48.6	06.0	49.6	06.1	50.6	06.2	51.6	06.3	52.6	06.5	53.6	06.6	54.6	06.7	55.6	06.8	83
8	48.5	06.8	49 5	07.0	50.5	07.1	51.5	07.2	52.5	07.4	53.5	07.5	54.5	07.7	55.5	07.8	82
9	48.4	07.7	49.4	07.8	50.4	08.0	51.4	08.1	52.3	08.3	53.3	08.4	54.3	08.6	55.3	08.8	81
10	48.3	08.5	49.2	08.7	50.2	08.9	51.2	09.0	52.0	09.2	53.2	09.4	54.2	09.6	55 1	09.7	80
11	48.1	09.3	49.1	09.5	50.1	09.7	51.0	09.9	52.0	10.1	53.0	10.3	54.0	10.5	55.0	10.7	79
12	47.9	10.2	48.9	10.4	49.9	10.6	50.9	10.8	51.8	11.0	52.8	11.2	53.8	11.4	54.8	11.6	78
13	47.7	11.0	48.7	11.2	49.7	11.5	50.7	11.7	51.6	11.9	52.6	12.1	53.6	12.4	54.6	12.6	77
14	47.5	11.9	48.5	12.1	49.5	12.3	50.5	12.6	51.4	12.8	52.4	13.1	53.4	13.3	54.3	13.5	76
15	47.3	12.7	48.3	12.9	49.3	13.2	50.2	13.5	51.2	13.7	52.2	14.0	53.1	14.2	54.1	14.5	75
16	47.1	13.5	48.1	13.8	49.0	14.1	50.0	14.3	50.9	14.6	51.9	14.9	52.9	15.2	53.8	15.4	74
17	46.9	14.3	47.8	14.6	48.8	14.9	49.7	15.2	50.7	15.5	51.6	15.8	52.6	16.1	53.6	16.4	73
18	46.6	15.1	47.6	15.5	48.5	15.8	49.5	16.1	50.4	16.4	51.4	16.7	52.3	17.0	53.3	17.3	72
19	46.3	16.0	47.3	16.3	48.2	16.6	49.2	16.9	50.1	17.3	51.1	17.6	52.0	17.9	52.9	18.2	71
20	46.0	16.8	47.0	17.1	47.9	17.4	48.9	17.8	49.8	18.1	50.7	18.5	51.7	18.8	52.6	19.2	70
21	45.7	17.6	46.7	17.9	47.6	18.3	48.5	18.6	49.5	19.0	50.4	19.4	51.3	19.7	52.3	20.1	69
22	45.4	18.4	46.4	18.7	47.3	19.1	48.2	19.5	49.1	19.9	50.1	20.2	51.0	20.6	51.9	21.0	68
23	45.1	19.1	46.0	19.5	46.9	19.9	47.9	20.3	48.8	20.7	49.7	21.1	50.6	21.5	51.5	21.9	67
24	44.8	19.9	45.7	20.3	46.6	20.7	47.5	21.2	48.4	21.6	49.3	22.0	50.2	22.4	51.2	22.8	66
25	44.4	20.7	45.3	21.1	46.2	21.6	47.1	22.0	48.0	22.4	48.9	22.8	49.8	23.2	50.8	23.7	65
26	44.0	21.5	44.9	21.9	45.8	22.4	46.7	22.8	47.6	23.2	48.5	23.7	49.4	24.1	50.3	24.5	64
27	43.7	22.2	44.6	22.7	45 4	23.2	46.3	23.6	47.2	24.1	48.1	24.5	49.0	25.0	49.9	25.4	63
28	43.3	23.0	44.1	23.5	45.0	23.9	45.9	24.4	46.8	24.9	47.7	25.4	48.6	25.8	49.4	26.3	62
29	42.9	23.8	43.7	24.2	44.6	24.7	45.5	25.2	46.4	25.7	47.2	26.2	48.1	26.7	49.0	27.1	61
30	42.4	24.5	43.3	25.0	44.2	25.5	45.0	26.0	45.9	26.5	46.8	27.0	47.6	27.5	48.5	28.0	60
31	42.0	25.2	42.9	25.8	43.7	26.3	44.6	26.8	45.4	27.3	46.3	27.8	47.1	28.3	48.0	28.8	59
32	41.6	26.0	42.4	26.5	43.3	27.0	44.1	27.6	44.9	28.1	45.8	28.6	46.6	29.1	47.5	29.7	58
33	41.1	26.7	41.9	27.2	42.8	27.8	43.6	28.3	44.4	28.9	45.3	29.4	46.1	30.0	47.0	30.5	57
34	40.6	27.4	41.5	28.0	42.3	28.5	43.1	29.1	43.9	29.6	44.8	30.2	45.6	30.8	46.4	31.3	56
35	40.1	28.1	41.0	28.7	41.8	29.3	42.6	29.8	43.4	30.4	44.2	31.0	45.1	31.5	45.9	32.1	55
36	39.6	28.8	40.5	29.4	41.3	30.0	42.1	30.6	42.9	31.2	43.7	31.7	44.5	32.3	45.3	32.9	54
37	39.1	29.5	39.9	30.1	40.7	30.7	41.5	31.3	42.3	31.9	43.1	32.5	43.9	33.1	44.7	33.7	53
38	38.6	30.2	39.4	30.8	40.2	31.4	41.0	32.0	41.8	32.6	42.6	33.2	43.3	33.9	44.1	34.5	52
39	38.1	30.8	38.9	31.5	39.6	32.1	40.4	32.7	41.2	33.4	42.0	34.0	42.7	34.6	43.5	35.2	51
40	37.5	31.5	38.3	32.1	39.1	32.8	39.8	33.4	40.6	34.1	41.4	34.7	42.1	35.4	42.9	36.0	50
41	37.0	32.1	37.7	32.8	38.5	33.5	39.2	34.1	40.0	34.8	40.8	35.4	41.5	36.1	42.3	36.7	49
42	36.4	32.8	37.2	33.5	37.9	34.1	38.6	34.8	39.4	35.5	40.1	36.1	40.9	36.8	41.6	37.5	48
43	35.8	33.4	36.6	34.1	37.3	34.8	38.0	35.5	38.8	36.1	39.5	36.8	40.2	37.5	41.0	38.2	47
44	35.2	34.0	36.0	34.7	36.7	35.4	37.4	36.1	38.1	36.8	38.8	37.5	39.6	38.2	40.3	38.9	46
45	34.6	34.6	35.4	35.4	36.1	36.1	36.8	36.8	37.5	37.5	38.2	38.2	38.9	38.9	39.6	39.6	45
Crse.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Crse.

Traverse Table.

Distance.	57		58		59		60		61		62		63		64		
Case.	Diff Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Case.
Pts.																	Pts.
¼	56.9	02.8	57.9	02.9	58.9	02.9	59.9	02.9	60.9	03.0	61.9	03.0	62.9	03.1	63.9	03.1	7¾
½	56.7	05.6	57.7	05.7	58.7	05.8	59.7	05 9	60.7	06.0	61.7	06.1	62.7	06.2	63.7	06.3	½
¾	56.4	08.4	57.4	08.5	58.4	08.7	59 3	08.8	60.3	08.9	61.3	09.1	62.3	09.2	63.3	09.4	¼
1	55.9	11.1	56.9	11.3	57.9	11.5	58.8	11.7	59.8	11.9	60.8	12.1	61.8	12.3	62.8	12.5	7
¼	55.3	13.9	56.3	14.1	57.2	14.3	58.2	14 6	59.2	14.8	60.1	15.1	61.1	15.3	62.1	15.6	¾
½	54.5	16.5	55.5	16.8	56.5	17.1	57.4	17.4	58.4	17.7	59.3	18.0	60.3	18.3	61.2	18.6	½
¾	53.7	19.2	54.6	19.5	55.5	19.9	56.5	20.2	57.4	20.5	58.4	20.9	59.3	21.2	60.3	21.6	¼
2	52.7	21.8	53.6	22.2	54.5	22.6	55.4	23.0	56.4	23.3	57.3	23.7	58.2	24.1	59.1	24.5	6
¼	51.5	24.4	52.4	24.8	53.3	25.2	54.2	25.7	55.1	26.1	56.0	26.5	57.0	26.9	57.9	27.4	¾
½	50.3	26.9	51.2	27.3	52.0	27.8	52.9	28.3	53.8	28.8	54.7	29.2	55.6	29.7	56.4	30.2	½
¾	48.9	29.3	49.7	29.8	50.6	30.3	51.5	30.8	52.3	31.4	53.2	31.9	54.0	32.4	54.9	32.9	¼
3	47.4	31.7	48.2	32.2	49.1	32.8	49.9	33.3	50 7	33.9	51.5	34.4	52.4	35.0	53.2	35.6	5
¼	45.8	34.0	46.6	34.6	47.4	35.1	48.2	35.7	49.0	36.3	49.8	36.9	50.6	37.5	51.4	38.1	¾
½	44 1	36.2	44.8	36 8	45.6	37.4	46.4	38.1	47.1	38.7	47.9	39.3	48.7	40.0	49.5	40.6	½
¾	42.2	38.3	43 0	38.9	43.7	39.6	44.5	40.3	45.2	41.0	45.9	41.6	46.7	42.3	47.4	43.0	¼
4	40.3	40.3	41.0	41.0	41.7	41.7	42.4	42.4	43.1	43.1	43.8	43.8	44.5	44.5	45.3	45.3	4
1°	57.0	01.0	58.0	01.0	59.0	01.0	60.0	01.0	61.0	01.0	62.0	01.1	63.0	01.1	64.0	01.1	89°
2	57.0	02.0	58.0	02.0	59.0	02.1	60.0	02.1	61.0	02.1	62.0	02.2	63.0	02.2	64.0	02.2	88
3	56.9	03.0	57.9	03.0	58.9	03.1	59.9	03.1	60.9	03.2	61.9	03.2	62.9	03.3	63.9	03.3	87
4	56.9	04.0	57.9	04.0	58.9	04.1	59.9	04.2	60.9	04.3	61.8	04.3	62.8	04.4	63.8	04.5	86
5	56.8	05.0	57.8	05.1	58.8	05.1	59.8	05.2	60.8	05.3	61.8	05.4	62.8	05.5	63.8	05.6	85
6	56.7	06.0	57.7	06.1	58.7	06.2	59.7	06.3	60.7	06.4	61.7	06.5	62.7	06.6	63.6	06.7	84
7	56.6	06.9	57.6	07.1	58.6	07.2	59.6	07.3	60.5	07.4	61.5	07.6	62.5	07.7	63.5	07.8	83
8	56.4	07.9	57.4	08.1	58.4	08.2	59.4	08.4	60.4	08.5	61.4	08.6	62.4	08.8	63.4	08.9	82
9	56.3	08.9	57.3	09.1	58.3	09.2	59.3	09.4	60.2	09.5	61.2	09.7	62.2	09.9	63.2	10.0	81
10	56.1	09.9	57.1	10.1	58.1	10.2	59.1	10.4	60.1	10.6	61.1	10.8	62.0	10.9	63.0	11.1	80
11	56.0	10.9	56.9	11.1	57.9	11.3	58.9	11.4	59.9	11.6	60.9	11.8	61.8	12.0	62.8	12.2	79
12	55.8	11.9	56.7	12.1	57.7	12.3	58.7	12.5	59.7	12.7	60.6	12.9	61.6	13.1	62.6	13.3	78
13	55.5	12.8	56.5	13.0	57.5	13.3	58.5	13.5	59.4	13.7	60.4	13.9	61.4	14.2	62.4	14.4	77
14	55.3	13.8	56.3	14.0	57.2	14.3	58.2	14.5	59.2	14.8	60.2	15.0	61.1	15.2	62.1	15.5	76
15	55.1	14.8	56.0	15.0	57.0	15.3	58.0	15.5	58.9	15.8	59.9	16.0	60.9	16.3	61.8	16.6	75
16	54.8	15.7	55.8	16.0	56.7	16.3	57.7	16.5	58.6	16.8	59.6	17.1	60.6	17.4	61.5	17.6	74
17	54.5	16.7	55.5	17.0	56.4	17.2	57.4	17.5	58.3	17.8	59.3	18.1	60.2	18.4	61.2	18.7	73
18	54.2	17.6	55.2	17.9	56.1	18.2	57.1	18.5	58.0	18.9	59.0	19.2	59.9	19.5	60.9	19.8	72
19	53.9	18.6	54.8	18.9	55.8	19.2	56.7	19.5	57.7	19.9	58.6	20.2	59.6	20.5	60.5	20.8	71
20	53.6	19.5	54.5	19.8	55.4	20.2	56.4	20.5	57.3	20.9	58.3	21.2	59.2	21.5	60.1	21.9	70
21	53.2	20.4	54.1	20.8	55.1	21.1	56.0	21.5	56.9	21.9	57.9	22.2	58.8	22.6	59.7	22.9	69
22	52.8	21.4	53.8	21.7	54.7	22.1	55.6	22.5	56.6	22.9	57.5	23.2	58.4	23.6	59.3	24.0	68
23	52.5	22.3	53.4	22.7	54.3	23.1	55.2	23.4	56.2	23.8	57.1	24.2	58.0	24.6	58.9	25.0	67
24	52.1	23.2	53.0	23.6	53.9	24.0	54.8	24.4	55.7	24.8	56.6	25.2	57.6	25.6	58.5	26.0	66
25	51.7	24.1	52.6	24.5	53.5	24.9	54.4	25.4	55.3	25.8	56.2	26.2	57.1	26.6	58.0	27.0	65
26	51.2	25.0	52.1	25.4	53.0	25.9	53.9	26.3	54.8	26.7	55.7	27.2	56.6	27.6	57.5	28.1	64
27	50.8	25.9	51.7	26.3	52.6	26.8	53.5	27.2	54.4	27.7	55.2	28.1	56.1	28.6	57.0	29.1	63
28	50.3	26.8	51.2	27.2	52.1	27.7	53 0	28.2	53.9	28.6	54.7	29.1	55.6	29.6	56.5	30.0	62
29	49.9	27.6	50.7	28.1	51.6	28.6	52.5	29.1	53.4	29.6	54.2	30.1	55.1	30.5	56.0	31.0	61
30	49.4	28.5	50.2	29.0	51.1	29.5	52.0	30.0	52.8	30.5	53.7	31.0	54.6	31.5	55.4	32.0	60
31	48.9	29.4	49.7	29.9	50.6	30.4	51.4	30.9	52.3	31.4	53.1	31.9	54.0	32.4	54.9	33.0	59
32	48.3	30.2	49.2	30.7	50.0	31.3	50.9	31.8	51.7	32.3	52.6	32.9	53.4	33.4	54.3	33.9	58
33	47.8	31.0	48.6	31.6	49.5	32.1	50.3	32.7	51.2	33.2	52.0	33.8	52.8	34.3	53.7	34.9	57
34	47.3	31.9	48.1	32.4	48.9	33.0	49.7	33.6	50.6	34.1	51.4	34.7	52.2	35.2	53.1	35.8	56
35	46.7	32.7	47.5	33.3	48.3	33.8	49.1	34.4	50.0	35.0	50.8	35.6	51.6	36.1	52.4	36.7	55
36	46.1	33.5	46.9	34 1	47.7	34.7	48.5	35.3	49.4	35.9	50.2	36.4	51.0	37.0	51.8	37.6	54
37	45.5	34.3	46.3	34.9	47.1	35.5	47.9	36.1	48.7	36.7	49.5	37.3	50.3	37.9	51.1	38.5	53
38	44.9	35.1	45.7	35.7	46.5	36.3	47.3	36.9	48.1	37.6	48.9	38.2	49.6	38.8	50.4	39.4	52
39	44.3	35.9	45.1	36.5	45.9	37.1	46.6	37.8	47.4	38.4	48.2	39.0	49.0	39.6	49.7	40.3	51
40	43.7	36.6	44.4	37.3	45.2	37.9	46.0	38.6	46.7	39.2	47.5	39.9	48.3	40.5	49.0	41.1	50
41	43.0	37.4	43.8	38.1	44.5	38.7	45.3	39.4	46.0	40.0	46.8	40.7	47.5	41.3	48.3	42.0	49
42	42.4	38.1	43.1	38 8	43.8	39.5	44.6	40.1	45.3	40.8	46.1	41.5	46.8	42.2	47.6	42.8	48
43	41.7	38.9	42.4	39.6	43.1	40.2	43.9	40.9	44.6	41.6	45.3	42.3	46.1	43.0	46.8	43.6	47
44	41.0	39.6	41.7	40.3	42.4	41.0	43.2	41.7	43.9	42.4	44.6	43.1	45.3	43.8	46.0	44.5	46
45	40.3	40.3	41.0	41.0	41.7	41.7	42.4	42.4	43.1	43.1	43.8	43.8	44.5	44.5	45.3	45.3	45
Case.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Case.

Traverse Table.

Distance.	65		66		67		68		69		70		71		72		
Cros.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep	Diff.Lat.	Dep.	Cros.
Fur.																	Fur.
¼	64.9	03.2	65.9	03.2	66.9	03.3	67.9	03.3	68.9	03.4	69.9	03.4	70.9	03.5	71.9	03.5	7¾
½	64.7	06.4	65.7	06.5	66.7	06.6	67.7	06.7	68.7	06.8	69.7	06.9	70.7	07.0	71.7	07.1	½
¾	64.3	09.5	65.3	09.7	66.3	09.8	67.3	10.0	68.2	10.1	69.2	10.3	70.2	10.4	71.2	10.6	¼
1	63.7	12.7	64.7	12.9	65.7	13.1	66.7	13.3	67.7	13 5	68.7	13.7	69.6	13.9	70.6	14.0	7
¼	63.1	15.8	64.0	16.0	65.0	16.3	66.0	16.5	66.9	16.8	67.9	17.0	68.9	17.3	69.8	17.5	¾
½	62.2	18.9	63.2	19.2	64.1	19.4	65.1	19.7	66.0	20.0	67.0	20.3	67.9	20.6	68.9	20.9	½
¾	61.2	21.9	62.1	22.2	63.1	22.6	64.0	22 9	65.0	23.2	65.9	23.6	66.8	23.9	67.8	24.3	¼
2	60.1	24.9	61.0	25.3	61.9	25.6	62.8	26.0	63.8	26.4	64.7	26.8	65.6	27.2	66.5	27.6	6
¼	58.8	27.8	59.7	28.2	60.6	28.6	61.5	29.1	62.4	29.5	63.3	29.9	64.2	30.4	65.1	30.8	¾
½	57.3	30.6	58.2	31.1	59.1	31.6	60.0	32.1	60.9	32.5	61.7	33.0	62.6	33.5	63.5	33.9	½
¾	55.8	33.4	56.6	33.9	57.5	34.4	58.3	35.0	59.2	35.5	60.0	36.0	60.9	36.5	61.8	37.0	¼
3	54.0	36.1	54.9	36.7	55 7	37.2	56.5	37.8	57.4	38.3	58.2	38.9	59.0	39 4	59.9	40.0	5
¼	52.2	38.7	53.0	39.3	53.8	39.9	54.6	40.5	55.4	41.1	56.2	41.7	57.0	42.3	57.8	42.9	¾
½	50.2	41.2	51.0	41.9	51.8	42.5	52.6	43.1	53.3	43.8	54.1	44.4	54.9	45.0	55.7	45.7	½
¾	48.2	43.6	48 9	44.3	49.6	45.0	50.4	45.7	51.1	46.3	51.9	47.0	52.6	47.7	53.3	48.3	¼
4	46.0	46.0	46.7	46.7	47.4	47.4	48 1	48.1	48.8	48.8	49.5	49.5	50.2	50.2	50.9	50.9	4
1°	65.0	01.1	66.0	01.2	67.0	01.2	68.0	01.2	69.0	01.2	70.0	01.2	71.0	01.2	72.0	01.3	89°
2	65.0	02.3	66.0	02.3	67.0	02.3	68.0	02.4	69.0	02.4	70.0	02.4	71.0	02.5	72.0	02.5	88
3	64.9	03.4	65.9	03.5	66.9	03.5	67.9	03.6	68.9	03.6	69.9	03.7	70.9	03.7	71.9	03.8	87
4	64 8	04.5	65.8	04.6	66.8	04.7	67.8	04.7	68.8	04.8	69.8	04.9	70.8	05.0	71.8	05.0	86
5	64.8	05.7	65.7	05.8	66.7	05.8	67.7	05.9	68.7	06.0	69.7	06.1	70.7	06.2	71.7	06.3	85
6	64.6	06.8	65.6	06.9	66.6	07.0	67.6	07.1	68.6	07.2	69.6	07.3	70.6	07.4	71.6	07.5	84
7	64.5	07.9	65.5	08.0	66.5	08.2	67.5	08 3	68.5	08 4	69.5	08.5	70.5	08.7	71.5	08.8	83
8	64.4	09.0	65.4	09.2	66.3	09.3	67.3	09.5	68.3	09.6	69.3	09.7	70.3	09.9	71.3	10.0	82
9	64.2	10.2	65.2	10.3	66.2	10.5	67.2	10.6	68.2	10.8	69.1	11.0	70.1	11.1	71.1	11.3	81
10	64.0	11.3	65.0	11.5	66.0	11.6	67.0	11.8	68.0	12.0	68.9	12.2	69.9	12.3	70.9	12.5	80
11	63.8	12.4	64.8	12.6	65.8	12.8	66.8	13.0	67.7	13.2	68.7	13.4	69.7	13.5	70.7	13.7	79
12	63.6	13.5	64.6	13.7	65.5	13.9	66.5	14.1	67.5	14.3	68.5	14.6	69.4	14.8	70.4	15.0	78
13	63.3	14.6	64.3	14.8	65.3	15.1	66.3	15.3	67.2	15.5	68.2	15.7	69.2	16.0	70.2	16.2	77
14	63.1	15.7	64.0	16.0	65.0	16.2	66.0	16.5	67.0	16.7	67.9	16.9	68.9	17.2	69.9	17.4	76
15	62.8	16.8	63.8	17.1	64.7	17.3	65.7	17.6	66.6	17.9	67.6	18.1	68.6	18.4	69.5	18.6	75
16	62.5	17.9	63.4	18.2	64.4	18.5	65.4	18.7	66.3	19.0	67.3	19.3	68.2	19.6	69.2	19.8	74
17	62.2	19.0	63.1	19.3	64.1	19.6	65.0	19.9	66.0	20.2	66.9	20.5	67.9	20.8	68.9	21.1	73
18	61.8	20.1	62.8	20.4	63.7	20.7	64.7	21.0	65.6	21.3	66.6	21.6	67.5	21.9	68.5	22.2	72
19	61.5	21.2	62.4	21.5	63.3	21.8	64.3	22.1	65.2	22.5	66.2	22.8	67.1	23.1	68.1	23.4	71
20	61.1	22.2	62.0	22.6	63.0	22.9	63.9	23.3	64.8	23.6	65.8	23.9	66.7	24.3	67.7	24.6	70
21	60.7	23.3	61.6	23.7	62.5	24.0	63.5	24.4	64.4	24.7	65.4	25.1	66.3	25.4	67.2	25.8	69
22	60.3	24.3	61.2	24.7	62.1	25.1	63.0	25.5	64.0	25.8	64.9	26.2	65.8	26.6	66.8	27.0	68
23	59.8	25.4	60.8	25 8	61.7	26.2	62.6	26.6	63.5	27.0	64.4	27.4	65.4	27.7	66.3	28.1	67
24	59.4	26.4	60.3	26.8	61.2	27.3	62.1	27.7	63.0	28.1	63.9	28.5	64.9	28.9	65.8	29.3	66
25	58.9	27.5	59.8	27.9	60.7	28.3	61.6	28.7	62.5	29.2	63.4	29.6	64.3	30.0	65.3	30.4	65
26	58.4	28.5	59.3	28.9	60.2	29.4	61.1	29.8	62.0	30.2	62.9	30.7	63.8	31.1	64.7	31.6	64
27	57.9	29.5	58.8	30.0	59.7	30.4	60.6	30.9	61.5	31.3	62.4	31.8	63.3	32.2	64.2	32.7	63
28	57.4	30.5	58.3	31.0	59.2	31.5	60.0	31.9	60.9	32.4	61.8	32.9	62.7	33.3	63.6	33 8	62
29	56.9	31.5	57.7	32.0	58.6	32.5	59.5	33.0	60.3	33.5	61.2	33.9	62.1	34.4	63.0	34.9	61
30	56.3	32.5	57.2	33.0	58.0	33 5	58.9	34.0	59.8	34.5	60.6	35.0	61.5	35.5	62.4	36.0	60
31	55.7	33.5	56.6	34.0	57.4	34.5	58.3	35 0	59.1	35.5	60.0	36.1	60.9	36.6	61.7	37.1	59
32	55.1	34.4	56.0	35.0	56.8	35.5	57.7	36.0	58.5	36.6	59.4	37.1	60.2	37.6	61.1	38.2	58
33	54.5	35.4	55.4	35.9	56.2	36.5	57.0	37.0	57.9	37.6	58.7	38.1	59.5	38.7	60.4	39.2	57
34	53.9	36.3	54.7	36.9	55.5	37.5	56.4	38.0	57.2	38.6	58.0	39.1	58.9	39.7	59.7	40.3	56
35	53.2	37.3	54.1	37.9	54.9	38.4	55.7	39.0	56.5	39.6	57.3	40.2	58.2	40.7	59.0	41.3	55
36	52.6	38.2	53.4	38.8	54.2	39.4	55.0	40.0	55.8	40.6	56.6	41.1	57.4	41.7	58.2	42.3	54
37	51.9	39.1	52.7	39.7	53.5	40.3	54.3	40.9	55.1	41.5	55.9	42.1	56.7	42.7	57.5	43.3	53
38	51.2	40.0	52.0	40.6	52.8	41.2	53.6	41.9	54.4	42.5	55.2	43.1	55.9	43.7	56.7	44.3	52
39	50.5	40.9	51.3	41.5	52.1	42.2	52.8	42.8	53.6	43.4	54.4	44.1	55.2	44.7	56.0	45.3	51
40	49.8	41.8	50.6	42.4	51.3	43.1	52.1	43.7	52.9	44.4	53.6	45.0	54.4	45.6	55.2	46.3	50
41	49.1	42.6	49.8	43.3	50.6	44.0	51.3	44.6	52.1	45.3	52.8	45.9	53.6	46.6	54.3	47.2	49
42	48.3	43.5	49.0	44.2	49.8	44.8	50 5	45.5	51.3	46.2	52.0	46.8	52.8	47.5	53.5	48.2	48
43	47.5	44.3	48.3	45 0	49.0	45.7	49.7	46.4	50.5	47.1	51.2	47.7	51.9	48.4	52.7	49.1	47
44	46.8	45.2	47.5	45.8	48.2	46.5	48.9	47.2	49.6	47.9	50.4	48.6	51.1	49.3	51 8	50.0	46
45	46.0	46.0	46.7	46.7	47.4	47.4	48.1	48.1	48.8	48.8	49.5	49.5	50.2	50.2	50.9	50.9	45
Cros.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat	Cros

Traverse Table.

Distance	73		74		75		76		77		78		79		80		
Cos	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Cos
Pts.																	Pts.
¼	72.9	03.6	73.9	03.6	74.9	03.7	75.9	03.7	76.9	03.8	77.9	03.8	78.9	03.9	79.9	03.9	7¾
½	72.6	07.2	73.6	07.3	74.6	07.4	75.6	07.4	76.6	07.5	77.6	07.6	78.6	07.7	79.6	07.8	½
¾	72.2	10.7	73.2	10.9	74.2	11.0	75.2	11.1	76.2	11.3	77.2	11.4	78.1	11.6	79.1	11.7	¼
1	71.6	14.2	72.6	14.4	73.6	14.6	74.5	14.8	75.5	15.0	76.5	15.2	77.5	15.4	78.5	15.6	7
¼	70.8	17.7	71.8	18.0	72.8	18.2	73.7	18.5	74.7	18.7	75.7	19.0	76.6	19.2	77.6	19.4	¾
½	69.9	21.2	70.8	21.5	71.8	21.8	72.7	22.1	73.7	22.3	74.6	22.6	75.6	22.9	76.6	23.2	½
¾	68.7	24.6	69.7	24.9	70.6	25.3	71.6	25.6	72.5	25.9	73.4	26.3	74.4	26.6	75.3	26.9	¼
2	67.4	27.9	68.4	28.3	69.3	28.7	70.2	29.1	71.1	29.5	72.1	29.9	73.0	30.2	73.9	30.6	6
¼	66.0	31.2	66.9	31.6	67.8	32.1	68.7	32.5	69.6	32.9	70.5	33.4	71.4	33.8	72.3	34.2	¾
½	64.4	34.4	65.3	34.9	66.1	35.4	67.0	35.8	67.9	36.3	68.8	36.8	69.7	37.2	70.6	37.7	½
¾	62.6	37.5	63.5	38.0	64.3	38.6	65.2	39.1	66.0	39.6	66.9	40.1	67.8	40.6	68.6	41.1	¼
3	60.7	40.6	61.5	41.1	62.4	41.7	63.2	42.2	64.0	42.8	64.8	43.3	65.7	43.9	66.5	44.4	5
¼	58.6	43.5	59.4	44.1	60.2	44.7	61.0	45.3	61.8	45.9	62.6	46.5	63.4	47.1	64.3	47.7	¾
½	56.4	46.3	57.2	46.9	58.0	47.6	58.7	48.2	59.5	48.8	60.3	49.5	61.1	50.1	61.8	50.7	½
¾	54.1	49.0	54.8	49.7	55.6	50.4	56.3	51.0	57.0	51.7	57.8	52.4	58.5	53.0	59.3	53.7	¼
4	51.6	51.6	52.3	52.3	53.0	53.0	53.7	53.7	54.4	54.4	55.2	55.2	55.9	55.9	56.6	56.6	4
1°	73.0	01.3	74.0	01.3	75.0	01.3	76.0	01.3	77.0	01.3	78.0	01.4	79.0	01.4	80.0	01.4	89°
2	73.0	02.5	74.0	02.6	75.0	02.6	76.0	02.7	77.0	02.7	78.0	02.7	79.0	02.8	80.0	02.8	88
3	72.9	03.8	73.9	03.9	74.9	03.9	75.9	04.0	76.9	04.0	77.9	04.1	78.9	04.1	79.9	04.2	87
4	72.8	05.1	73.8	05.2	74.8	05.2	75.8	05.3	76.8	05.4	77.8	05.4	78.8	05.5	79.8	05.6	86
5	72.7	06.4	73.7	06.4	74.7	06.5	75.7	06.6	76.7	06.7	77.7	06.8	78.7	06.9	79.7	07.0	85
6	72.6	07.6	73.6	07.7	74.6	07.8	75.6	07.9	76.6	08.0	77.6	08.2	78.6	08.3	79.6	08.4	84
7	72.5	08.9	73.4	09.0	74.4	09.1	75.4	09.3	76.4	09.4	77.4	09.5	78.4	09.6	79.4	09.7	83
8	72.3	10.2	73.3	10.3	74.3	10.4	75.3	10.6	76.3	10.7	77.2	10.9	78.2	11.0	79.2	11.1	82
9	72.1	11.4	73.1	11.6	74.1	11.7	75.1	11.9	76.1	12.0	77.0	12.2	78.0	12.4	79.0	12.5	81
10	71.9	12.7	72.9	12.8	73.9	13.0	74.8	13.2	75.8	13.4	76.8	13.5	77.8	13.7	78.8	13.9	80
11	71.7	13.9	72.6	14.1	73.6	14.3	74.6	14.5	75.6	14.7	76.6	14.9	77.5	15.1	78.5	15.3	79
12	71.4	15.2	72.4	15.4	73.4	15.6	74.3	15.8	75.3	16.0	76.3	16.2	77.3	16.4	78.3	16.6	78
13	71.1	16.4	72.1	16.6	73.1	16.9	74.1	17.1	75.0	17.3	76.0	17.5	77.0	17.8	77.9	18.0	77
14	70.8	17.7	71.8	17.9	72.8	18.1	73.7	18.4	74.7	18.6	75.7	18.9	76.7	19.1	77.6	19.4	76
15	70.5	18.9	71.5	19.2	72.4	19.4	73.4	19.7	74.4	19.9	75.3	20.2	76.3	20.4	77.3	20.7	75
16	70.2	20.1	71.1	20.4	72.1	20.7	73.1	20.9	74.0	21.2	75.0	21.5	75.9	21.8	76.9	22.1	74
17	69.8	21.3	70.8	21.6	71.7	21.9	72.7	22.2	73.6	22.5	74.6	22.8	75.5	23.1	76.5	23.4	73
18	69.4	22.6	70.4	22.9	71.3	23.2	72.3	23.5	73.2	23.8	74.2	24.1	75.1	24.4	76.1	24.7	72
19	69.0	23.8	70.0	24.1	70.9	24.4	71.9	24.7	72.8	25.1	73.8	25.4	74.7	25.7	75.6	26.0	71
20	68.6	25.0	69.5	25.3	70.5	25.7	71.4	26.0	72.4	26.3	73.3	26.7	74.2	27.0	75.2	27.4	70
21	68.2	26.2	69.1	26.5	70.0	26.9	71.0	27.2	71.9	27.6	72.8	28.0	73.8	28.3	74.7	28.7	69
22	67.7	27.3	68.6	27.7	69.5	28.1	70.5	28.5	71.4	28.8	72.3	29.2	73.2	29.6	74.2	30.0	68
23	67.2	28.5	68.1	28.9	69.0	29.3	70.0	29.7	70.9	30.1	71.8	30.5	72.7	30.9	73.6	31.3	67
24	66.7	29.7	67.6	30.1	68.5	30.5	69.4	30.9	70.3	31.3	71.3	31.7	72.2	32.1	73.1	32.5	66
25	66.2	30.9	67.1	31.3	68.0	31 7	68.9	32.1	69.8	32.5	70.7	33.0	71.6	33.4	72.5	33.8	65
26	65.6	32.0	66.5	32.4	67.4	32.9	68.3	33.3	69.2	33.8	70.1	34.2	71.0	34.6	71.9	35.1	64
27	65.0	33.1	65.9	33.6	66.8	34.0	67.7	34.5	68.6	35.0	69.5	35.4	70.4	35.9	71.3	36.3	63
28	64.5	34.3	65.3	34.7	66.2	35.2	67.1	35.7	68.0	36.1	68.9	36.6	69.8	37.1	70.6	37.6	62
29	63.8	35.4	64.7	35.9	65.6	36.4	66.5	36.8	67.3	37.3	68.2	37.8	69.1	38.3	70.0	38.8	61
30	63.2	36.5	64.1	37.0	65.0	37.5	65.8	38.0	66.7	38.5	67.5	39.0	68.4	39.5	69.3	40.0	60
31	62.6	37.6	63.4	38.1	64.3	38.6	65.1	39.1	66.0	39.7	66.9	40.2	67.7	40.7	68.6	41.2	59
32	61.9	38.7	62.8	39.2	63.6	39.7	64.5	40.3	65.3	40.8	66.1	41.3	67.0	41.9	67.8	42.4	58
33	61.2	39.8	62.1	40.3	62.9	40.8	63.7	41.4	64.6	41.9	65.4	42.5	66.3	43.0	67.1	43.6	57
34	60.5	40.8	61.3	41.4	62.2	41.9	63.0	42.5	63.8	43.1	64.7	43.6	65.5	44.2	66.3	44.7	56
35	59.8	41.9	60.6	42.4	61.4	43.0	62.3	43.6	63.1	44.2	63.9	44.7	64.7	45.3	65.5	45.9	55
36	59.1	42.9	59.9	43.5	60.7	44.1	61.5	44.7	62.3	45.3	63.1	45.8	63.9	46.4	64.7	47.0	54
37	58.3	43.9	59.1	44.5	59.9	45.1	60.7	45.7	61.5	46.3	62.3	46.9	63.1	47.5	63.9	48.1	53
38	57.5	44.9	58.3	45.6	59.1	46.2	59.9	46.8	60.7	47.4	61.5	48.0	62.3	48.6	63.0	49.3	52
39	56.7	45.9	57.5	46.6	58.3	47.2	59.1	47.8	59.8	48.5	60.6	49.1	61.4	49.7	62.2	50.3	51
40	55.9	46.9	56.7	47.6	57.5	48.2	58.2	48.9	59.0	49.5	59.8	50.1	60.5	50.8	61.3	51.4	50
41	55.1	47.9	55.8	48.5	56.6	49.2	57.4	49.9	58.1	50.5	58.9	51.2	59.6	51.8	60.4	52.5	49
42	54.2	48.8	55.0	49.5	55.7	50.2	56.5	50.9	57.2	51.5	58.0	52.2	58.7	52.9	59.5	53.5	48
43	53.4	49.8	54.1	50.5	54.9	51.1	55.6	51.8	56.3	52.5	57.0	53.2	57.8	53.9	58.5	54.6	47
44	52.5	50.7	53.2	51.4	54.0	52.1	54.7	52.8	55.4	53.5	56.1	54.2	56.8	54.9	57.5	55.6	46
45	51.6	51.6	52.3	52.3	53.0	53.0	53.7	53.7	54.4	54.4	55.2	55.2	55.9	55.9	56.6	56.6	45
Cos	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Cos

Traverse Table.

Distance.	81		82		83		84		85		86		87		88		
Cres.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Cres.
Fm.																	Fm.
¼	80.9	04.0	81.9	04.0	82.9	04.1	83.9	04.1	84.9	04.2	85.9	04.2	86.9	04.3	87.9	04.3	¼
½	80.6	07.9	81.6	08.0	82.6	08.1	83.6	08.2	84.6	08.3	85.6	08.4	86.6	08.5	87.6	08.6	½
¾	80.1	11.9	81.1	12.0	82.1	12.2	83.1	12.3	84.1	12.5	85.1	12.6	86.1	12.8	87.0	12.9	¾
1	79.4	15.8	80.4	16.0	81.4	16.2	82.4	16.4	83.4	16.6	84.3	16.8	85.3	17.0	86.3	17.2	1
¼	78.6	19.7	79.5	19.9	80.5	20.2	81.5	20.4	82.5	20.7	83.4	20.9	84.4	21.1	85.4	21.4	¼
½	77.5	23.5	78.5	23.8	79.4	24.1	80.4	24.4	81.3	24.7	82.3	25.0	83.3	25.2	84.2	25.5	½
¾	76.3	27.3	77.2	27.6	78.1	28.0	79.1	28.3	80.0	28.6	81.0	29.0	81.9	29.3	82.9	29.6	¾
2	74.8	31.0	75.8	31.4	76.7	31.8	77.6	32.1	78.5	32.5	79.5	32.9	80.4	33.3	81.3	33.7	6
¼	73.2	34.6	74.1	35.1	75.0	35.5	75.9	35.9	76.8	36.3	77.7	36.8	78.6	37.2	79.6	37.6	¼
½	71.4	38.2	72.3	38.6	73.2	39.1	74.1	39.6	75.0	40.1	75.9	40.5	76.7	41.0	77.6	41.5	½
¾	69.5	41.6	70.3	42.2	71.2	42.7	72.0	43.2	72.9	43.7	73.8	44.2	74.6	44.7	75.5	45.2	¾
3	67.3	45.0	68.2	45.6	69.0	46.1	69.8	46.7	70.7	47.2	71.5	47.8	72.3	48.3	73.2	48.9	5
¼	65.1	48.3	65.9	48.9	66.7	49.4	67.5	50.0	68.3	50.6	69.1	51.2	69.9	51.8	70.7	52.4	¼
½	62.6	51.4	63.4	52 0	64.2	52.7	64.9	53.3	65.7	53.9	66.5	54.6	67.2	55.2	68.0	55.8	½
¾	60.0	54.4	60.8	55.1	61.5	55.7	62.2	56.4	63.0	57.1	63.7	57.7	64.5	58.4	65.2	59.1	¾
4	57.3	57.3	58.0	58.0	58.7	58.7	59.4	59.4	60.1	60.1	60.8	60.8	61.5	61.5	62.2	62.2	4
1°	81·0	01.4	82.0	01.4	83.0	01.4	84.0	01.5	85.0	01.5	86.0	01.5	87.0	01.5	88.0	01 5	89°
2	81.0	02.8	82.0	02.9	82.9	02.9	83.9	02.9	84.9	03.0	85.9	03.0	86.9	03.0	87.9	03.1	88
3	80.9	04.2	81.9	04.3	82.9	04.3	83.9	04.4	84.9	04.4	85.9	04.5	86.9	04.6	87.9	04.6	87
4	80.8	05.7	81.8	05.7	82.8	05.8	83.8	05.9	84.8	05.9	85.8	06.0	86.8	06.1	87.8	06.1	86
5	80.7	07.1	81.7	07.1	82.7	07.2	83.7	07.3	84.7	07.4	85.7	07.5	86.7	07.6	87.7	07.7	85
6	80.6	08.5	81.6	08.6	82.5	08.7	83.5	08.8	84.5	08.9	85.5	09.0	86.5	09.1	87.5	09.2	84
7	80.4	09.9	81.4	10.0	82.4	10.1	83.4	10.2	84.4	10.4	85.4	10.5	86.4	10.6	87 3	10.7	83
8	80.2	11.3	81.2	11.4	82.2	11.6	83.2	11.7	84.2	11.8	85.2	12.0	86.2	12.1	87.1	12.2	82
9	80.0	12.7	81.0	12.8	82.0	13.0	83.0	13.1	84.0	13.3	84.9	13.5	85.9	13.6	86.9	13.8	81
10	79.8	14.1	80.8	14.2	81.7	14.4	82.7	14.6	83.7	14.8	84.7	14.9	85.7	15.1	86.7	15.3	80
11	79.5	15.5	80.5	15.6	81.5	15.8	82.5	16.0	83.4	16.2	84.4	16.4	85.4	16.6	86.4	16.8	79
12	79.2	16.8	80.2	17.0	81.2	17.3	82.2	17.5	83.1	17.7	84.1	17.9	85.1	18.1	86.1	18.3	78
13	78.9	18.2	79.9	18.4	80.9	18.7	81.8	18.9	82.8	19.1	83.8	19.3	84.8	19.6	85.7	19 8	77
14	78.6	19.6	79.6	19.8	80.5	20.1	81.5	20.3	82.5	20.6	83.4	20.8	84.4	21.0	85.4	21.3	76
15	78.2	21.0	79.2	21.2	80.2	21.5	81.1	21.7	82.1	22.0	83.1	22.3	84.0	22.5	85.0	22.8	75
16	77.9	22.3	78.8	22.6	79.8	22.9	80.7	23.2	81.7	23.4	82.7	23.7	83.6	24.0	84.6	24.3	74
17	77.5	23.7	78.4	24.0	79.4	24.3	80.3	24.6	81.3	24.9	82.2	25.1	83.2	25.4	84.2	25.7	73
18	77.0	25.0	78.0	25.3	78.9	25.6	79.9	26.0	80.8	26.3	81.8	26.6	82.7	26.9	83.7	27.2	72
19	76.6	26.4	77.5	26.7	78.5	27.0	79.4	27.3	80.4	27.7	81.3	28.0	82.3	28.3	83.2	28.7	71
20	76.1	27.7	77.1	28.0	78.0	28.4	78.9	28.7	79.9	29.1	80.8	29.4	81.8	29.8	82.7	30.1	70
21	75.6	29.0	76.6	29.4	77.5	29.7	78.4	30.1	79.4	30.5	80.3	30.8	81.2	31.2	82.2	31.5	69
22	75.1	30.3	76.0	30.7	77.0	31.1	77.9	31.5	78.8	31.8	79.7	32.2	80.7	32.6	81.6	33.0	68
23	74.6	31.6	75.5	32.0	76.4	32.4	77.3	32.8	78.2	33.2	79.2	33.6	80.1	34.0	81.0	34.4	67
24	74.0	32.9	74.9	33.4	75.8	33.8	76.7	34.2	77.7	34.6	78.6	35.0	79.5	35.4	80.4	35.8	66
25	73.4	34.2	74.3	34.7	75.2	35.1	76.1	35.5	77.0	35.9	77.9	36.3	78.8	36.8	79.8	37.2	65
26	72.8	35.5	73.7	35.9	74.6	36.4	75.5	36.8	76.4	37.3	77.3	37.7	78.2	38.1	79.1	38.6	64
27	72.2	36.8	73.1	37.2	74.0	37.7	74.8	38.1	75.7	38.6	76.6	39.0	77.5	39.5	78.4	40.0	63
28	71.5	38.0	72.4	38.5	73.3	39.0	74.2	39.4	75.1	39.9	75.9	40.4	76.8	40.8	77.7	41.3	62
29	70.8	39.3	71.7	39.8	72.6	40.2	73.5	40.7	74 3	41.2	75.2	41.7	76.1	42.2	77.0	42.7	61
30	70.1	40.5	71.0	41.0	71.9	41.5	72.7	42.0	73.6	42.5	74.5	43.0	75.3	43.5	76.2	44.0	60
31	69.4	41.7	70.3	42.2	71.1	42.7	72.0	43.3	72.9	43.8	73.7	44.3	74.6	44.8	75.4	45.3	59
32	68.7	42.9	69.5	43.5	70.4	44.0	71.2	44.5	72.1	45.0	72.9	45.6	73.8	46.1	74.6	46.6	58
33	67.9	44.1	68.8	44.7	69.6	45.2	70.4	45.7	71.3	46.3	72.1	46.8	73.0	47.4	73.8	47.9	57
34	67.2	45.3	68.0	45.9	68.8	46.4	69.6	47.0	70.5	47.5	71.3	48.1	72.1	48.6	73.0	49.2	56
35	66.4	46.5	67.2	47.0	68.0	47.6	68.8	48.2	69.6	48.8	70.4	49.3	71.3	49.9	72.1	50.5	55
36	65.5	47.6	66.3	48.2	67.1	48.8	68.0	49.4	68.8	50.0	69.6	50.5	70.4	51.1	71.2	51.7	54
37	64.7	48.7	65.5	49.3	66.3	50.0	67.1	50.6	67.9	51.2	68.7	51.8	69.5	52.4	70.3	53.0	53
38	63.8	49.9	64.6	50.5	65.4	51.1	66.2	51.7	67.0	52.3	67.8	52.9	68.6	53.6	69.3	54.2	52
39	62.9	51.0	63.7	51.6	64.5	52.2	65.3	52.9	66.1	53.5	66.8	54.1	67.6	54.8	68.4	55.4	51
40	62.0	52.1	62.8	52.7	63.6	53.4	64.3	54.0	65.1	54.6	65.9	55.3	66.6	55.9	67.4	56.6	50
41	61.1	53.1	61.9	53.8	62.6	54.5	63.4	55.1	64.2	55.8	64.9	56.4	65.7	57.1	66.4	57.7	49
42	60.2	54.2	60 9	54.9	61.7	55.5	62.4	56.2	63.2	56.9	63.9	57.5	64.7	58.2	65.4	58.9	48
43	59.2	55.2	60.0	55.9	60.7	56.6	61.4	57.3	62.2	58.0	62.9	58.7	63.6	59.3	64.4	60.0	47
44	58.3	56.3	59.0	57.0	59.7	57.7	60.4	58.4	61.1	59.0	61.9	59.7	62.6	60.4	63.3	61.1	46
45	57.3	57.3	58.0	58.0	58.7	58.7	59.4	59.4	60.1	60.1	60.8	60.8	61.5	61.5	62 2	62.2	45
Cres	Dep.	Diff.Lat.	Dep	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat	Dep.	Diff.Lat.	Cres

Traverse Table.

Dist.	89		90		91		92		93		94		95		96		Dist.
Course	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Course
Pts																	Pts
¼	88.9	04.4	89.9	04.4	90.9	04.5	91.9	04.5	92.9	04.6	93.9	04.6	94.9	04.7	95.9	04.7	¼
½	88.6	08.7	89.6	08.8	90.6	08.9	91.6	09.0	92.6	09.1	93.5	09.2	94.5	09.3	95.5	09.4	½
¾	88.0	13.1	89.0	13.2	90.0	13.3	91.0	13.5	92.0	13.6	93.0	13.8	94.0	13.9	95.0	14.1	¾
1	87.3	17.4	88.3	17.6	89.2	17.8	90.2	18.0	91.2	18.1	92.2	18.3	93.2	18.5	94.2	18.7	7
¼	86.3	21.6	87.3	21.9	88.3	22.1	89.2	22.4	90.2	22.6	91.2	22.8	92.2	23.1	93.1	23.3	¼
½	85.2	25.8	86.1	26.1	87.1	26.4	88.0	26.7	89.0	27.0	90.0	27.3	90.9	27.6	91.9	27 9	½
¾	83.8	30.0	84.7	30.3	85.7	30.7	86.6	31.0	87.6	31.3	88.5	31.7	89.4	32.0	90.4	32.3	¾
2	82.2	34.1	83.2	34.4	84.1	34.8	85.0	35.2	85.9	35.6	86.8	36.0	87.8	36.4	88.7	36.7	6
¼	80.5	38.1	81.4	38.5	82.3	38.9	83.2	39.3	84.1	39.8	85.0	40.2	85.9	40.6	86.8	41.1	¼
½	78.5	41.9	79.4	42.4	80.3	42.9	81.1	43.4	82.0	43.8	82.9	44.3	83.8	44.8	84.7	45.2	½
¾	76.3	45.7	77.2	46.3	78.1	46.8	78.9	47.3	79.8	47.8	80.6	48.3	81.5	48.8	82.3	49.3	¾
3	74.0	49.4	74.8	50.0	75.7	50.6	76.5	51.1	77.3	51.7	78.2	52.2	79.0	52.8	79.8	53.3	5
¼	71.5	53.0	72.3	53.6	73.1	54.2	73.9	54.8	74.7	55.4	75.5	56.0	76.3	56.6	77.1	57.2	¼
½	68.8	56.5	69.6	57.1	70.3	57.7	71.1	58.4	71.9	59.0	72.7	59.6	73.4	60.3	74.2	60.9	½
¾	65.9	59.8	66.7	60.4	67.4	61.1	68.2	61.8	68.9	62.4	69.6	63.1	70.4	63.8	71.1	64.5	¾
4	62.9	62.9	63.6	63.6	64.3	64.3	65.1	65.1	65.8	65.8	66.5	66.5	67.2	67.2	67.9	67.9	4
1°	89.0	01.6	90.0	01.6	91.0	01.6	92.0	01.6	93.0	01.6	94.0	01.6	95.0	01.7	96.0	01.7	89°
2	88.9	03.1	89.9	03.1	90.9	03.2	91.9	03.2	92.9	03.2	93.9	03.3	94.9	03.3	95.9	03.4	88
3	88.9	04.7	89.9	04.7	90.9	04.8	91.9	04.8	92.9	04.9	93.9	04.9	94.9	05.0	95.9	05.0	87
4	88.8	06.2	89.8	06.3	90.8	06.3	91.8	06.4	92.8	06.5	93.8	06.6	94.8	06.6	95.8	06.7	86
5	88.7	07.8	89.7	07.8	90.7	07.9	91.6	08.0	92 6	08.1	93.6	08.2	94.6	08.3	95.6	08.4	85
6	88.5	09.3	89.5	09.4	90.5	09.5	91.5	09.6	92.5	09.7	93.5	09.8	94.5	09.9	95.5	10.0	84
7	88.3	10.8	89.3	11.0	90.3	11.1	91.3	11.2	92.3	11.3	93.3	11.5	94.3	11.6	95.3	11.7	83
8	88.1	12.4	89.1	12.5	90.1	12.7	91.1	12.8	92.1	12.9	93.1	13.1	94.1	13.2	95.1	13.4	82
9	87.9	13.9	88.9	14.1	89.9	14.2	90.9	14.4	91.9	14.5	92.8	14.7	93.8	14.9	94.8	15.0	81
10	87.6	15.5	88.6	15.6	89.6	15.8	90.6	16.0	91.6	16.1	92.6	16.3	93.6	16.5	94.5	16.7	80
11	87.4	17.0	88.3	17.2	89.3	17.4	90.3	17.6	91.3	17.7	92.3	17.9	93.3	18.1	94.2	18.3	79
12	87.1	18.5	88.0	18.7	89.0	18.9	90.0	19.1	91.0	19.3	91.9	19.5	92.9	19.8	93.9	20.0	78
13	86.7	20.0	87.7	20.2	88.7	20.5	89.6	20.7	90.6	20.9	91.6	21.1	92.6	21.4	93.5	21.6	77
14	86.4	21.5	87.3	21.8	88.3	22.0	89.3	22.3	90.2	22.5	91.2	22.7	92.2	23.0	93.1	23.2	76
15	86.0	23.0	86.9	23.3	87.9	23.6	88.9	23.8	89.8	24.1	90.8	24.3	91.8	24.6	92.7	24.8	75
16	85.6	24.5	86.5	24.8	87.5	25.1	88.4	25.4	89.4	25.6	90.4	25.9	91.3	26.2	92.3	26.5	74
17	85.1	26.0	86.1	26.3	87.0	26.6	88.0	26.9	88.9	27.2	89.9	27.5	90.8	27.8	91.8	28.1	73
18	84.6	27.5	85.6	27.8	86.5	28.1	87.5	28.4	88.4	28.7	89.4	29.0	90.4	29.4	91.3	29.7	72
19	84.2	29.0	85.1	29.3	86.0	29.6	87.0	30.0	87.9	30.3	88.9	30.6	89.8	30.9	90.8	31.3	71
20	83.6	30.4	84.6	30.8	85.5	31.1	86.5	31.5	87.4	31.8	88.3	32.1	89.3	32.5	90.2	32.8	70
21	83.1	31.9	84.0	32.3	85.0	32.6	85.9	33.0	86.8	33.3	87.8	33.7	88.7	34.0	89.6	34.4	69
22	82.5	33.3	83.4	33.7	84.4	34.1	85.3	34.5	86.2	34.8	87.2	35.2	88.1	35.6	89.0	36.0	68
23	81.9	34.8	82.8	35.2	83.8	35.6	84.7	35.9	85.6	36.3	86.5	36.7	87.4	37.1	88.4	37.5	67
24	81.3	36.2	82.2	36.6	83.1	37.0	84.0	37.4	85.0	37.8	85.9	38.2	86.8	38.6	87.7	39.0	66
25	80.7	37.6	81.6	38.0	82.5	38.5	83.4	38.9	84.3	39.3	85.2	39.7	86.1	40.1	87.0	40.6	65
26	80.0	39.0	80.9	39.5	81.8	39.9	82.7	40.3	83.6	40.8	84.5	41.2	85.4	41.6	86.3	42.1	64
27	79.3	40.4	80.2	40.9	81.1	41.3	82.0	41.8	82.9	42.2	83.8	42.7	84.6	43.1	85.5	43.6	63
28	78.6	41.8	79.5	42.3	80.3	42.7	81.2	43.2	82.1	43.7	83.0	44.1	83.9	44.6	84.8	45.1	62
29	77.8	43.1	78.7	43.6	79.6	44.1	80.5	44.6	81.3	45.1	82.2	45.6	83.1	46.1	84.0	46.5	61
30	77.1	44.5	77.9	45.0	78.8	45.5	79.7	46.0	80.5	46.5	81.4	47.0	82.3	47.5	83.1	48.0	60
31	76 3	45.8	77.1	46.4	78.0	46.9	78.9	47.4	79.7	47.9	80.6	48.4	81.4	48.9	82.3	49.4	59
32	75.5	47.2	76.3	47.7	77.2	48.2	78.0	48.8	78.9	49.3	79.7	49.8	80.6	50.3	81.4	50.9	58
33	74.6	48.5	75.5	49.0	76.3	49.6	77.2	50.1	78.0	50.7	78.8	51.2	79.7	51.7	80.5	52.3	57
34	73.8	49.8	74·6	50.3	75.4	50.9	76.3	51.4	77.1	52.0	77.9	52.6	78.8	53.1	79.6	53.7	56
35	72.9	51.0	73.7	51.6	74.5	52.2	75.4	52.8	76.2	53.3	77.0	53.9	77.8	54.5	78.6	55.1	55
36	72.0	52.3	72.8	52.9	73.6	53.5	74.4	54.1	75.2	54.7	76.0	55.3	76.9	55.8	77.7	56.4	54
37	71.1	53.6	71.9	54.2	72.7	54.8	73.5	55.4	74.3	56.0	75.1	56.6	75.9	57.2	76.7	57.8	53
38	70.1	54.8	70.9	55.4	71.7	56.0	72.5	56.6	73.3	57.3	74.1	57.9	74.9	58.5	75.6	59.1	52
39	69.2	56.0	69.9	56.6	70.7	57.3	71.5	57.9	72.3	58.5	73.1	59.2	73.8	59.8	74.6	60.4	51
40	68.2	57.2	68.9	57.9	69.7	58.5	70.5	59.1	71.2	59.8	72.0	60.4	72.8	61.1	73.5	61.7	50
41	67.2	58.4	67.9	59.0	68.7	59.7	69.4	60.4	70.2	61.0	70.9	61.7	71.7	62.3	72.5	63.0	49
42	66.1	59.6	66.9	60.2	67.6	60.9	68.4	61.6	69.1	62.2	69.9	62.9	70.6	63.6	71.3	64.2	48
43	65.1	60.7	65.8	61.4	66.6	62.1	67.3	62.7	68.0	63.4	68.7	64.1	69.5	64.8	70.2	65.5	47
44	64.0	61.8	64 7	62.5	65.5	63.2	66.2	63.9	66.9	64.6	67.6	65.3	68.3	66.0	69.1	66.7	46
45	62.9	62.9	63.6	63.6	64.3	64.3	65.1	65.1	65.8	65.8	66.5	66.5	67.2	67.2	67.9	67.9	45
Course	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Course

Traverse Table.

Distance.	97		98		99		100		101		102		103		104		
Course. Pts.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep	Diff.Lat.	Dep	Diff.Lat.	Dep.	Diff.Lat.	Dep	Diff.Lat.	Dep.	Distance. Pts.
¼	96.9	04.8	97.9	04.8	98.9	04.9	99.9	04.9	100.9	05.0	101.9	05.0	102.9	05.1	103.9	05.1	7¼
½	96.5	09.5	97.5	09.6	98.5	09.7	99.5	09.8	100.5	09.9	101.5	10.0	102.5	10.1	103.5	10.2	½
¾	95.9	14.2	96.9	14.4	97.9	14.5	98.9	14.7	99.9	14.8	100.9	15.0	101.9	15.1	102.9	15.3	¾
1	95.1	18.9	96.1	19.1	97.1	19.3	98.1	19.5	99.1	19.7	100.0	19.9	101.0	20.1	102.0	20.3	7
¼	94.1	23.6	95.1	23.8	96.0	24.1	97.0	24.3	98.0	24.5	98.9	24.8	99.9	25.0	100.9	25.3	¼
½	92.8	28.2	93.8	28.4	94.7	28.7	95.7	29.0	96.7	29.3	97.6	29.6	98.6	29.9	99.5	30.2	½
¾	91.3	32.7	92.3	33.0	93.2	33.3	94.2	33.7	95.1	34.0	96.0	34.4	97.0	34.7	97.9	35.0	¾
2	89.6	37.1	90.5	37.5	91.5	37.9	92.4	38.3	93.3	38.7	94.2	39.0	95.2	39.4	96.1	39.8	6
¼	87.7	41.5	88.6	41.9	89.5	42.3	90.4	42.8	91.3	43.2	92.2	43.6	93.1	44.0	94.0	44.5	¼
½	85.6	45.7	86.4	46.2	87.3	46.7	88.2	47.1	89.1	47.6	90.0	48.1	90.8	48.5	91.7	49.0	½
¾	83.2	49.9	84.1	50.4	84.9	50.9	85.8	51.4	86.6	51.9	87.5	52.4	88.3	52.9	89.2	53.5	¾
3	80.6	53.9	81.5	54.4	82.3	55.0	83.1	55.6	84.0	56.1	84.8	56.7	85.6	57.2	86.5	57.8	5
¼	77.9	57.8	78.7	58.4	79.5	59.0	80.3	59.6	81.1	60.2	81.9	60.8	82.7	61.4	83.5	62.0	¼
½	75.0	61.5	75.7	62.2	76.5	62.8	77.3	63.4	78.1	64.1	78.8	64.7	79.6	65.3	80.4	66.0	½
¾	71.9	65.1	72.6	65.8	73.3	66.5	74.1	67.2	74.8	67.8	75.6	68.5	76.3	69.2	77.1	69.8	¾
4	68.6	68.6	69.3	69.3	70.0	70.0	70.7	70.7	71.4	71.4	72.1	72.1	72.8	72.8	73.5	73.5	4
1°	97.0	01.7	98.0	01.7	99.0	01.7	100.0	01.7	101.0	01.8	102.0	01.8	103.0	01.8	104.0	01.8	89°
2	96.9	03.4	97.9	03.4	98.9	03.5	99.9	03.5	100.9	03.5	101.9	03.6	102.9	03.6	103.9	03.6	88
3	96.9	05.1	97.9	05.1	98.9	05.2	99.9	05.2	100.9	05.3	101.9	05.3	102.9	05.4	103.9	05.4	87
4	96.8	06.8	97.8	06.8	98.8	06.9	99.8	07.0	100.8	07.0	101.8	07.1	102.7	07.2	103.7	07.3	86
5	96.6	08.5	97.6	08.5	98.6	08.6	99.6	08.7	100.6	08.8	101.6	08.9	102.6	09.0	103.6	09.1	85
6	96.5	10.1	97.5	10.2	98.5	10.3	99.5	10.5	100.4	10.6	101.4	10.7	102.4	10.8	103.4	10.9	84
7	96.3	11.8	97.3	11.9	98.3	12.1	99.3	12.2	100.2	12.3	101.2	12.4	102.2	12.6	103.2	12.7	83
8	96.1	13.5	97.0	13.6	98.0	13.8	99.0	13.9	100.0	14.1	101.0	14.2	102.0	14.3	103.0	14.5	82
9	95.8	15.2	96.8	15.3	97.8	15.5	98.8	15.6	99.8	15.8	100.7	16.0	101.7	16.1	102.7	16.3	81
10	95.5	16.8	96.5	17.0	97.5	17.2	98.5	17.4	99.5	17.5	100.5	17.7	101.4	17.9	102.4	18.1	80
11	95.2	18.5	96.2	18.7	97.2	18.9	98.2	19.1	99.1	19.3	100.1	19.5	101.1	19.7	102.1	19.8	79
12	94.9	20.2	95.9	20.4	96.8	20.6	97.8	20.8	98.8	21.0	99.8	21.2	100.7	21.4	101.7	21.6	78
13	94.5	21.8	95.5	22.0	96.5	22.3	97.4	22.5	98.4	22.7	99.4	22.9	100.4	23.2	101.3	23.4	77
14	94.1	23.5	95.1	23.7	96.1	24.0	97.0	24.2	98.0	24.4	99.0	24.7	99.9	24.9	100.9	25.2	76
15	93.7	25.1	94.7	25.4	95.6	25.6	96.6	25.9	97.6	26.1	98.5	26.4	99.5	26.7	100.5	26.9	75
16	93.2	26.7	94.2	27.0	95.2	27.3	96.1	27.6	97.1	27.8	98.0	28.1	99.0	28.4	100.0	28.7	74
17	92.8	28.4	93.7	28.7	94.7	28.9	95.6	29.2	96.6	29.5	97.5	29.8	98.5	30.1	99.5	30.4	73
18	92.3	30.0	93.2	30.3	94.2	30.6	95.1	30.9	96.1	31.2	97.0	31.5	98.0	31.8	98.9	32.1	72
19	91.7	31.6	92.7	31.9	93.6	32.2	94.6	32.6	95.5	32.9	96.4	33.2	97.4	33.5	98.3	33.9	71
20	91.2	33.2	92.1	33.5	93.0	33.9	94.0	34.2	94.9	34.5	95.8	34.9	96.8	35.2	97.7	35.6	70
21	90.6	34.8	91.5	35.1	92.4	35.5	93.4	35.8	94.3	36.2	95.2	36.6	96.2	36.9	97.1	37.3	69
22	89.9	36.3	90.9	36.7	91.8	37.1	92.7	37.5	93.6	37.8	94.6	38.2	95.5	38.6	96.4	39.0	68
23	89.3	37.9	90.2	38.3	91.1	38.7	92.1	39.1	93.0	39.5	93.9	39.9	94.8	40.2	95.7	40.6	67
24	88.6	39.5	89.5	39.9	90.4	40.3	91.4	40.7	92.3	41.1	93.2	41.5	94.1	41.9	95.0	42.3	66
25	87.9	41.0	88.8	41.4	89.7	41.8	90.6	42.3	91.5	42.7	92.4	43.1	93.3	43.5	94.3	44.0	65
26	87.2	42.5	88.1	43.0	89.0	43.4	89.9	43.8	90.8	44.3	91.7	44.7	92.6	45.2	93.5	45.6	64
27	86.4	44.0	87.3	44.5	88.2	44.9	89.1	45.4	90.0	45.9	90.9	46.3	91.8	46.8	92.7	47.2	63
28	85.6	45.5	86.5	46.0	87.4	46.5	88.3	46.9	89.2	47.4	90.1	47.9	90.9	48.4	91.8	48.8	62
29	84.8	47.0	85.7	47.5	86.6	48.0	87.5	48.5	88.3	49.0	89.2	49.5	90.1	49.9	91.0	50.4	61
30	84.0	48.5	84.9	49.0	85.7	49.5	86.6	50.0	87.5	50.5	88.3	51.0	89.2	51.5	90.1	52.0	60
31	83.1	50.0	84.0	50.5	84.9	51.0	85.7	51.5	86.6	52.0	87.4	52.5	88.3	53.0	89.1	53.6	59
32	82.3	51.4	83.1	51.9	84.0	52.5	84.8	53.0	85.7	53.5	86.5	54.1	87.3	54.6	88.2	55.1	58
33	81.4	52.8	82.2	53.4	83.0	53.9	83.9	54.5	84.7	55.0	85.5	55.6	86.4	56.1	87.2	56.6	57
34	80.4	54.2	81.2	54.8	82.1	55.4	82.9	55.9	83.7	56.5	84.6	57.0	85.4	57.6	86.2	58.2	56
35	79.5	55.6	80.3	56.2	81.1	56.8	81.9	57.4	82.7	57.9	83.6	58.5	84.4	59.1	85.2	59.7	55
36	78.5	57.0	79.3	57.6	80.1	58.2	80.9	58.8	81.7	59.4	82.5	60.0	83.3	60.5	84.1	61.1	54
37	77.5	58.4	78.3	59.0	79.1	59.6	79.9	60.2	80.7	60.8	81.5	61.4	82.3	62.0	83.1	62.6	53
38	76.4	59.7	77.2	60.3	78.0	61.0	78.8	61.6	79.6	62.2	80.4	62.8	81.2	63.4	82.0	64.0	52
39	75.4	61.0	76.2	61.7	76.9	62.3	77.7	62.9	78.5	63.6	79.3	64.2	80.0	64.8	80.8	65.4	51
40	74.3	62.4	75.1	63.0	75.8	63.6	76.6	64.3	77.4	64.9	78.1	65.6	78.9	66.2	79.7	66.8	50
41	73.2	63.6	74.0	64.3	74.7	64.9	75.5	65.6	76.2	66.3	77.0	66.9	77.7	67.6	78.5	68.2	49
42	72.1	64.9	72.8	65.6	73.6	66.2	74.3	66.9	75.1	67.6	75.8	68.3	76.5	68.9	77.3	69.6	48
43	70.9	66.2	71.7	66.8	72.4	67.5	73.1	68.2	73.9	68.9	74.6	69.6	75.3	70.2	76.1	70.9	47
44	69.8	67.4	70.5	68.1	71.2	68.8	71.9	69.5	72.7	70.2	73.4	70.9	74.1	71.5	74.8	72.2	46
45	68.6	68.6	69.3	69.3	70.0	70.0	70.7	70.7	71.4	71.4	72.1	72.1	72.8	72.8	73.5	73.5	45
Course.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat	Dep.	Diff.Lat.	Dep.	Diff.Lat	Dep.	Diff.Lat.	Dep.	Diff.Lat	Course.

TABLE 3.

Traverse Table.

105		106		107		108		109		110		111	
Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.
05.2	105.9	05.2	106.9	05.3	107.9	05.3	108.9	05.4	109.9	05.4	110.9		
10.3	105.5	10.4	106.5	10.5	107.5	10.6	108.5	10.7	109.5	10.8	110.5		
15.4	104.8	15.5	105.8	15.7	106.8	15.8	107.8	16.0	108.8	16.1	109.8		
20.5	104.0	20.7	104.9	20.9	105.9	21.1	106.9	21.3	107.9	21.5	108.9		
25.5	102.8	25.8	103.8	26.0	104.8	26.2	105.7	26.5	106.7	26.7	107.7		
30.5	101.4	30.8	102.4	31.1	103.4	31.4	104.3	31.6	105.3	31.9	106.2		
35.4	99.8	35.7	100.7	36.0	101.7	36.4	102.6	36.7	103.6	37.1	104.5		
40.2	97.9	40.6	98.9	41.0	99.8	41.3	100.7	41.7	101.6	42.1	102.6		
44.9	95.8	45.3	96.7	45.8	97.6	46.2	98.5	46.6	99.4	47.0	100.3		
49.5	93.5	50.0	94.4	50.4	95.3	50.9	96.1	51.4	97.0	51.8	97.9		
54.0	90.9	54.5	91.8	55.0	92.6	55.5	93.5	56.0	94.3	56.5	95.2		
58.3	88.1	58.9	89.0	59.4	89.8	60.0	90.6	60.6	91.5	61.1	92.3		
62.6	85.1	63.1	85.9	63.7	86.7	64.3	87.5	64.9	88.4	65.5	89.2		
66.6	81.9	67.2	82.7	67.9	83.5	68.5	84.3	69.1	85.0	69.8	85.8		
70.5	78.5	71.2	79.3	71.8	80.0	72.5	80.8	73.2	81.5	73.9	82.2		
74.2	75.0	75.0	75.7	75.7	76.4	76.4	77.1	77.1	77.8	77.8	78.5		
01.8	106.0	01.8	107.0	01.9	108.0	01.9	109.0	01.9	110 0	01.9	111.0		
03.7	105.9	03.7	106.9	03.7	107.9	03.8	108.9	03.8	109.9	03.8	110.9		
05.5	105.9	05.5	106.9	05.6	107.9	05.7	108.9	05.7	109.8	05.8	110.8		
07.3	105.7	07.4	106.7	07.5	107.7	07.5	108.7	07.6	109.7	07.7	110.7		
09.2	105.6	09.2	106.6	09.3	107.6	09.4	108.6	09.5	109.6	09.6	110.6		
11.0	105.4	11.1	106.4	11.2	107.4	11.3	108.4	11.4	109.4	11.5	110.4		
12.8	105.2	12.9	106.2	13.0	107.2	13.2	108.2	13.3	109.2	13.4	110.2		
14.6	105.0	14.8	106.0	14.9	106.9	15.0	107.9	15.2	108.9	15.3	109.9		
16.4	104.7	16.6	105.7	16.7	106.7	16.9	107.7	17.1	108.6	17.2	109.6		
18.2	104.4	18.4	105.4	18.6	106.4	18.8	107.3	18.9	108.3	19.1	109.3		
20.0	104.1	20.2	105.0	20.4	106.0	20.6	107.0	20.8	108.0	21.0	109.0		
21.8	103.7	22.0	104.7	22.2	105.6	22.5	106.6	22.7	107.6	22.9	108.6		
23.6	103.3	23.8	104.3	24.1	105.2	24.3	106.2	24.5	107.2	24.7	108.2		
25.4	102.9	25.6	103.8	25.9	104.8	26.1	105.8	26.4	106.7	26.6	107.7		
27.2	102.4	27.4	103.4	27.7	104.3	28.0	105.3	28.2	106.3	28.5	107.2		
28.9	101.9	29.2	102.9	29.5	103.8	29.8	104.8	30.0	105.7	30.3	106.7		
30.7	101.4	31.0	102.3	31.3	103.3	31.6	104.2	31.9	105.2	32.2	106.1		
32.4	100.8	32.8	101.8	33.1	102.7	33.4	103.7	33.7	104.6	34.0	105.6		
34.2	100.2	34.5	101.2	34.8	102.1	35.2	103.1	35.5	104.0	35.8	105.0		
35.9	99.6	36.3	100.5	36.6	101.5	36.9	102.4	37.3	103.4	37.6	104.3		
37.6	99.0	38.0	99.9	38.3	100.8	38.7	101.8	39.1	102.7	39.4	103.6		
39.3	98.3	39.7	99.2	40.1	100.1	40.5	101.1	40.8	102.0	41.2	102.9		
41.0	97.6	41.4	98.5	41.8	99.4	42.2	100.3	42.6	101.3	43.0	102.2		
42.7	96.8	43.1	97.7	43.5	98.7	43.9	99.6	44.3	100.5	44.7	101.4		
44.4	96.1	44.8	97.0	45.2	97.9	45.6	98.8	46.1	99.7	46.5	100.6		
46.0	95.3	46.5	96.2	46.9	97.1	47.3	98.0	47.8	98.9	48.2	99.8		
47.7	94.4	48.1	95.3	48.6	96.2	49.0	97.1	49.5	98.0	49.9	98.9		
49.3	93.6	49.8	94.5	50.2	95.4	50.7	96.2	51.2	97.1	51.6	98.0		
50.9	92.7	51.4	93.6	51.9	94.5	52.4	95.3	52.8	96.2	53.3	97.1		
52.5	91.8	53.0	92.7	53.5	93.5	54.0	94.4	54.5	95.3	55.0	96.1		
54.1	90.9	54.6	91.7	55.1	92.6	55.6	93.4	56.1	94.3	56.7	95.1		
55.6	90.0	56.2	90.7	56.7	91.6	57.2	92.4	57.8	93.3	58.3	94.1		
57.2	89.0	57.7	89.7	58.3	90.6	58.8	91.4	59.4	92.3	59.9	93.1		
58.7	88.1	59.3	88.7	59.8	89.5	60.4	90.4	61.0	91.2	61.5	92.0		
60.2	87.0	60.8	87.6	61.4	88.5	61.9	89.3	62.5	90.1	63.1	90.9		
61.7	86.0	62.3	86.6	62.9	87.4	63.5	88.2	64.1	89.0	64.7	89.8		
63.2	84.9	63.8	85.5	64.4	86.3	65.0	87.1	65.6	87.8	66.2	88.6		
64.6	83.9	65.3	84.3	65.9	85.1	66.5	85.9	67.1	86.7	67.7	87.5		
66.1	82.7	66.7	83.2	67.3	83.9	68.0	84.7	68.6	85.5	69.2	86.3		
67.5	81.6	68.1	82.0	68.8	82.7	69.4	83.5	70.1	84.3	70.7	85.0		
68 9	80.4	69.5	80.8	70.2	81.5	70.9	82.3	71.5	83.0	72.2	83.8		
70.3	79.2	70.9	79.5	71.6	80.3	72.3	81.0	72.9	81.7	73.6	82.5		
71.6	78.0	72.3	78.3	73.0	79.0	73.7	79.7	74.3	80.4	75.0	81.2		
72.9	76.8	73.6	77.0	74.3	77.7	75.0	78.4	75.7	79.1	76.4	79.8		
74.2	75.5	75.0	75.7	75.7	76.4	76.4	77.1	77.1	77.8	77.8	78.5		
Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Dif

Traverse Table.

Distance.	113		114		115		116		117		118		119		120		
Course.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Course.
Pts.																	Pts.
¼	112.9	05.5	113.9	05.6	114.9	05.6	115.9	05.7	116.9	05.7	117.9	05.8	118.9	05.8	119.9	05.9	7¾
½	112.5	11.1	113.5	11.2	114.4	11.3	115.4	11.4	116.4	11·5	117.4	11.6	118.4	11.7	119.4	11.8	½
¾	111.8	16.6	112.8	16.7	113.7	16.9	114.7	17.0	115.7	17.2	116.7	17.3	117.7	17.5	118.7	17.6	¼
1	110.8	22.0	111.8	22.2	112.8	22.4	113.8	22.6	114.7	22.8	115.7	23.0	116.7	23.2	117.7	23.4	7
¼	109.6	27.5	110.6	27.7	111.6	27.9	112.5	28.2	113.5	28.4	114.5	28.7	115.4	28.9	116.4	29.2	¼
½	108.1	32.8	109.1	33.1	110.1	33.4	111.0	33.7	112.0	34.0	112.9	34.2	113.9	34.5	114.8	34.8	½
¾	106.4	38.1	107.3	38.4	108.3	38.7	109.2	39.1	110.2	39.4	111.1	39.7	112.0	40.1	113.0	40.4	¼
2	104.4	43.2	105.3	43.6	106.3	44.0	107.2	44.4	108.1	44.8	109.0	45.2	109.9	45.5	110.9	45.9	6
¼	102.1	48.3	103.1	48.7	104.0	49.2	104.9	49.6	105.8	50.0	106.7	50.5	107.6	50.9	108.5	51.3	¾
½	99.7	53.3	100.5	53.7	101.4	54.2	102.3	54.7	103.2	55.1	104.1	55.6	105.0	56.1	105.8	56.6	½
¾	96.9	58.1	97.8	58.6	98.6	59.1	99.5	59.6	100.4	60·1	101.2	60.7	102.1	61.2	102.9	61.7	¼
3	94.0	62.8	94.8	63.3	95.6	63.9	96.4	64.4	97.3	65.0	98.1	65.6	98.9	66.1	99.8	66.7	5
¼	90.8	67.3	91.6	67.9	92.4	68.5	93.2	69.1	94.0	69.7	94.8	70.3	95.6	70.9	96.4	71.5	¾
½	87.3	71.7	88.1	72.3	88.9	73.0	89.7	73.6	90.4	74.2	91.2	74.9	92.0	75.5	92.8	76.1	½
¾	83.7	75.9	84.5	76.5	85.2	77.2	85.9	77.9	86.7	78.6	87.4	79.2	88.2	79.9	88.9	80.6	¼
4	79.9	79.9	80.6	80.6	81.3	81.3	82.0	82.0	82.7	82.7	83.4	83.4	84.1	84.1	84.8	84.8	4
1°	113.0	02.0	114.0	02.0	115.0	02.0	116.0	02.0	117.0	02.0	118.0	02.1	119.0	02.1	120.0	02.1	89°
2	112.9	03.9	113.9	04.0	114.9	04.0	115.9	04.0	116.9	04.1	117.9	04.1	118.9	04.2	119.9	04.2	88
3	112.8	05.9	113.8	06.0	114.8	06.0	115.8	06.1	116.8	06.1	117.8	06.2	118.8	06.2	119.8	06.3	87
4	112.7	07.9	113.7	08.0	114.7	08.0	115.7	08.1	116.7	08.2	117.7	08.2	118.7	08.3	119.7	08.4	86
5	112.6	09.8	113.6	09.9	114.6	10.0	115.6	10.1	116.6	10.2	117.6	10.3	118.5	10.4	119.5	10.5	85
6	112.4	11.8	113.4	11.9	114.4	12.0	115.4	12.1	116.4	12.2	117.4	12.3	118.3	12.4	119.3	12.5	84
7	112.2	13.8	113.2	13.9	114.1	14.0	115.1	14.1	116·1	14.3	117.1	14.4	118.1	14.5	119.1	14.6	83
8	111.9	15.7	112.9	15.9	113.9	16.0	114.9	16.1	115.9	16.3	116.9	16.4	117.8	16.6	118.8	16.7	82
9	111.6	17.7	112.6	17.8	113.6	18.0	114.6	18.1	115.6	18.3	116.5	18.5	117.5	18.6	118.5	18.8	81
10	111.3	19.6	112.3	19.8	113.3	20.0	114.2	20.1	115.2	20.3	116.2	20.5	117.2	20.7	118.2	20.8	80
11	110.9	21.6	111.9	21.8	112.9	21.9	113.9	22.1	114.9	22.3	115.8	22.5	116.8	22.7	117.8	22.9	79
12	110.5	23.5	111.5	23.7	112.5	23.9	113.5	24.1	114.4	24.3	115.4	24.5	116.4	24.7	117.4	24.9	78
13	110.1	25.4	111.1	25.6	112.1	25.9	113.0	26.1	114.0	26.3	115.0	26.5	116.0	26.8	116.9	27.0	77
14	109.6	27.3	110.6	27.6	111.6	27.8	112.6	28.1	113.5	28.3	114.5	28.6	115.5	28.8	116.4	29.0	76
15	109.1	29.2	110.1	29.5	111.1	29 8	112.0	30.0	113.0	30.3	114.0	30.5	114.9	30.8	115.9	31.1	75
16	108.6	31.1	109.6	31.4	110.5	31.7	111.5	32.0	112.5	32.2	113.4	32.5	114.4	32.8	115.4	33.1	74
17	108.1	33.0	109.0	33.3	110.0	33.6	110.9	33.9	111.9	34.2	112.8	34.5	113.8	34.8	114.8	35.1	73
18	107.5	34.9	108.4	35.2	109.4	35.5	110.3	35.8	111.3	36.2	112 2	36.5	113.2	36.8	114.1	37.1	72
19	106.8	36.8	107.8	37.1	108.7	37.4	109.7	37.8	110.6	38.1	111.6	38.4	112.5	38.7	113.5	39.1	71
20	106.2	38.6	107.1	39.0	108.1	39.3	109.0	39.7	109.9	40.0	110.9	40.4	111.8	40.7	112.8	41.0	70
21	105.5	40.5	106.4	40.9	107.4	41.2	108.3	41.6	109.2	41.9	110.2	42.3	111.1	42.6	112.0	43.0	69
22	104.8	42.3	105.7	42.7	106.6	43.1	107.6	43.5	108.5	43.8	109.4	44.2	110.3	44.6	111.3	45.0	68
23	104.0	44.2	104.9	44.5	105.9	44.9	106.8	45.3	107.7	45.7	108.6	46.1	109.5	46.5	110.5	46.9	67
24	103.2	46.0	104.1	46.4	105.1	46.8	106.0	47.2	106.9	47.6	107.8	48.0	108.7	48.4	109.6	48.8	66
25	102.4	47.8	103.3	48.2	104.2	48.6	105.1	49.0	106.0	49.4	106.9	49.9	107.9	50.3	108.8	50.7	65
26	101.6	49.5	102.5	50.0	103.4	50.4	104.3	50.9	105.2	51.3	106.1	51.7	107.0	52.2	107.9	52.6	64
27	100.7	51.3	101.6	51.8	102.5	52.2	103.4	52.7	104.2	53.1	105.1	53.6	106.0	54.0	106.9	54.5	63
28	99.8	53.1	100.7	53.5	101.5	54.0	102.4	54.5	103.3	54.9	104.2	55.4	105.1	55.9	106.0	56.3	62
29	98.8	54.8	99.7	55.3	100.6	55.8	101.5	56.2	102.3	56.7	103.2	57.2	104.1	57.7	105.0	58 2	61
30	97.9	56.5	98.7	57.0	99.6	57.5	100.5	58.0	101.3	58.5	102.2	59.0	103.1	59.5	103.9	60.0	60
31	96.9	58.2	97.7	58.7	98.6	59.2	99.4	59.7	100.3	60.3	101.1	60.8	102.0	61.3	102.9	61.8	59
32	95.8	59.9	96.7	60.4	97.5	60.9	98.4	61.5	99.2	62.0	100.1	62.5	100.9	63.1	101.8	63.6	58
33	94.8	61.5	95.6	62.1	96.4	62.6	97.3	63.2	98.1	63.7	99.0	64.3	99.8	64.8	100.6	65.4	57
34	93.7	63.2	94.5	63.7	95.3	64.3	96.2	64.9	97.0	65.4	97.8	66.0	98 7	66.5	99.5	67.1	56
35	92.6	64.8	93.4	65.4	94.2	66.0	95.0	66.5	95.8	67.1	96.7	67.7	97.5	68.3	98.3	68.8	55
36	91.4	66.4	92.2	67.0	93.0	67.6	93.8	68.2	94.7	68.8	95.5	69.4	96.3	69.9	97.1	70.5	54
37	90.2	68.0	91.0	68.6	91.8	69.2	92.6	69.8	93.4	70.4	94.2	71.0	95.0	71.6	95.8	72.2	53
38	89.0	69.6	89.8	70.2	90.6	70.8	91.4	71.4	92.2	72.0	93.0	72.6	93.8	73.3	94.6	73.9	52
39	87.8	71.1	88.6	71.7	89.4	72.4	90.1	73.0	90.9	73.6	91.7	74.3	92.5	74.9	93.3	75.5	51
40	86.6	72.6	87.3	73.3	88.1	73.9	88.9	74.6	89.6	75.2	90.4	75.8	91.2	76.5	91.9	77.1	50
41	85·3	74.1	86.0	74.8	86.8	75.4	87.5	76.1	88.3	76.8	89.1	77.4	89.8	78.1	90.6	78.7	49
42	84.0	75.6	84.7	76.3	85.5	77.0	86.2	77.6	86.9	78.3	87.7	79.0	88.4	79.6	89.2	80.3	48
43	82.6	77.1	83.4	77.7	84.1	78.4	84.8	79 1	85.6	79.8	86.3	80.5	87.0	81.2	87.8	81.8	47
44	81.3	78.5	82.0	79.2	82.7	79.9	83.4	80.6	84.2	81.3	84.9	82 0	85.6	82.7	86.3	83.4	46
45	79.9	79.9	80.6	80.6	81.3	81.3	82.0	82.0	82.7	82.7	83.4	83.4	84.1	84.1	84.9	84.9	45
Course.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Course.

Traverse Table.

Distance	121		122		123		124		125		126		127		128		
Cras.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Cras.
Pts.																	Pts.
¼	120.9	05.9	121.9	06.0	122.9	06.0	123.9	06.1	124.9	06.1	125.8	06.2	126.8	06.2	127.8	06.3	75 ¼
½	120.4	11.9	121.4	12.0	122.4	12.1	123.4	12.2	124.4	12.3	125.4	12.3	126.4	12.4	127.4	12.5	½
¾	119.7	17.7	120.7	17.9	121.7	18.0	122.7	18.2	123.6	18.3	124.6	18.5	125.6	18.6	126.6	18.8	¾
1	118.7	23 6	119.7	23.8	120.6	24.0	121.6	24.2	122.6	24.4	123.6	24.6	124.6	24.8	125.5	25.0	7
¼	117.4	29.4	118.3	29.6	119.3	29.9	120.3	30.1	121.3	30.4	122.2	30.6	123.2	30.9	124.2	31.1	¼
½	115.8	35.1	116.8	35.4	117.7	35.7	118.7	36.0	119.6	36.3	120.6	36.6	121.5	36.9	122.5	37.2	½
¾	113.9	40.8	114.9	41.1	115.8	41.4	116.7	41.8	117.7	42.1	118.6	42.4	119.6	42.8	120.5	43.1	¾
2	111.8	46.3	112.7	46.7	113.6	47.1	114.6	47.5	115.5	47.8	116.4	48.2	117.3	48.6	118.3	49.0	6
¼	109.4	51.7	110.3	52.2	111.2	52.6	112.1	53.0	113.0	53.5	113.9	53.9	114.8	54.3	115.7	54.7	¼
½	106.7	57.0	107.6	57.5	108.5	58.0	109.4	58.4	110.2	58.9	111.1	59.4	112.0	59.9	112.9	60.3	½
¾	103.8	62.2	104.6	62.7	105.5	63.2	106.4	63.7	107.2	64.3	108.1	64.8	108.9	65.3	109.8	65.8	¾
3	100.6	67.2	101.4	67.8	102.3	68.3	103.1	68.9	103.9	69.4	104.8	70.0	105.6	70.6	106.4	71.1	5
¼	97.2	72.1	98.0	72.7	98.8	73.3	99.6	73 9	100.4	74.5	101.2	75.1	102.0	75.7	102.8	76.3	¼
½	93.5	76.8	94 3	77.4	95.1	78.0	95.8	78.7	96.6	79.3	97.4	79.9	98.2	80.6	98.9	81.2	½
¾	89.6	81.3	90.4	81.9	91.1	82.6	91.9	83.3	92.6	83.9	93.4	84.6	94.1	85.3	94.8	86.0	¾
4	85.6	85.6	86.3	86.3	87.0	87.0	87.7	87.7	88.4	88.4	89.1	89.1	89.8	89.8	90.5	90.5	4
1°	121.0	02.1	122.0	02.1	123.0	02.1	124.0	02.2	125.0	02.2	126.0	02.2	127.0	02.2	128.0	02.2	89°
2	120.9	04.2	121.9	04.3	122.9	04.3	123.9	04.3	124.9	04.4	125.9	04.4	126.9	04.4	127.9	04.5	88
3	120.8	06.3	121.8	06.4	122.8	06.4	123.8	06.5	124.8	06.5	125.8	06.6	126.8	06.6	127.8	06.7	87
4	120.7	08.4	121.7	08.5	122.7	08.6	123.7	08.6	124.7	08.7	125.7	08.8	126.7	08.9	127.7	08.9	86
5	120.5	10.5	121.5	10.6	122.5	10.7	123.5	10.8	124.5	10.9	125.5	11.0	126.5	11.1	127.5	11.2	85
6	120.3	12.6	121.3	12.8	122.3	12.9	123.3	13.0	124.3	13.1	125.3	13.2	126.3	13.3	127.3	13.4	84
7	120.1	14.7	121.1	14.9	122.1	15.0	123.1	15.1	124.1	15.2	125.1	15.4	126.1	15.5	127.0	15.6	83
8	119.8	16.8	120.8	17.0	121.8	17.1	122.8	17.3	123.8	17.4	124.8	17.5	125.8	17.7	126.8	17.8	82
9	119.5	18.9	120.5	19.1	121.5	19.2	122.5	19.4	123.5	19.6	124.4	19.7	125.4	19.9	126.4	20.0	81
10	119.2	21.0	120.1	21.2	121.1	21.4	122.1	21.5	123.1	21.7	124.1	21.9	125.1	22.1	126.1	22.2	80
11	118.8	23.1	119.8	23.3	120.7	23.5	121.7	23.7	122.7	23.9	123.7	24.0	124.7	24.2	125.6	24.4	79
12	118.4	25.2	119.3	25.4	120.3	25.6	121.3	25.8	122.3	26.0	123.2	26.2	124.2	26.4	125.2	26.6	78
13	117.9	27.2	118.9	27.4	119.8	27.7	120.8	27.9	121.8	28.1	122.8	28.3	123.7	28.6	124.7	28.8	77
14	117.4	29.3	118.4	29.5	119.3	29.8	120.3	30.0	121.3	30.2	122.3	30.5	123.2	30.7	124.2	31.0	76
15	116.9	31.3	117.8	31.6	118.8	31.8	119.8	32.1	120.7	32.4	121.7	32.6	122.7	32.9	123.6	33.1	75
16	116.3	33.4	117.3	33.6	118.2	33,9	119.2	34.2	120.2	34.5	121.1	34.7	122.1	35.0	123.0	35.3	74
17	115.7	35.4	116.7	35.7	117.6	36.0	118.6	36.3	119.5	36.5	120.5	36.8	121.5	37.1	122.4	37.4	73
18	115.1	37.4	116.0	37.7	117.0	38.0	117.9	38.3	118.9	38.6	119.8	38.9	120.8	39.2	121.7	39.6	72
19	114.4	39.4	115.4	39.7	116.3	40.0	117.2	40.4	118.2	40.7	119.1	41.0	120.1	41.3	121.0	41.7	71
20	113.7	41.4	114.6	41.7	115.6	42.1	116.5	42.4	117.5	42.8	118.4	43.1	119.3	43.4	120.3	43.8	70
21	113.0	43.4	113.9	43.7	114.8	44.1	115.8	44.4	116.7	44.8	117.6	45.2	118.6	45.5	119.5	45.9	69
22	112.2	45.3	113.1	45.7	114.0	46.1	115.0	46.5	115.9	46.8	116.8	47.2	117.8	47.6	118.7	47.9	68
23	111.4	47.3	112.3	47.7	113.2	48.1	114.1	48.5	115.1	48.8	116.0	49.2	116.9	49.6	117.8	50.0	67
24	110.5	49.2	111.5	49.6	112.4	50.0	113.3	50.4	114.2	50.8	115.1	51.2	116.0	51.7	116.9	52.1	66
25	109.7	51.1	110.6	51.6	111.5	52.0	112.4	52.4	113.3	52.8	114.2	53.2	115.1	53.7	116.0	54.1	65
26	108.8	53.0	109.7	53.5	110.6	53.9	111.5	54.4	112.3	54.8	113.2	55.2	114.1	55.7	115.0	56.1	64
27	107 8	54.9	108.7	55.4	109.6	55.8	110.5	56.3	111.4	56.7	112.3	57.2	113.2	57.7	114.0	58.1	63
28	106.8	56.8	107.7	57.3	108.6	57.7	109.5	58.2	110.4	58.7	111.3	59.2	112.1	59.6	113.0	60.1	62
29	105.8	58.7	106.7	59.1	107.6	59.6	108.5	60.1	109.3	60.6	110.2	61.1	111.1	61.6	112.0	62.1	61
30	104.8	60.5	105.7	61.0	106.5	61.5	107.4	62.0	108.3	62.5	109.1	63.0	110.0	63.5	110.9	64.0	60
31	103.7	62.3	104.6	62.8	105.4	63.3	106.3	63.9	107.1	64.4	108.0	64.9	108.9	65.4	109.7	65.9	59
32	102.6	64.1	103.5	64.7	104.3	65.2	105.2	65.7	106.0	66.2	106.9	66.8	107.7	67.3	108.6	67.8	58
33	101.5	65.9	102.3	66.4	103.2	67.0	104.0	67.5	104.8	68.1	105.7	68.6	106.5	69.2	107.3	69.7	57
34	100.3	67.7	101.1	68.2	102.0	68.8	102.8	69.3	103.6	69.9	104.5	70.5	105.3	71.0	106.1	71.6	56
35	99.1	69.4	99.9	70.0	100.8	70.5	101.6	71.1	102.4	71.7	103.2	72.3	104.0	72.8	104.9	73.4	55
36	97.9	71.1	98.7	71.7	99.5	72.3	100.3	72.9	101.1	73.5	101.9	74.1	102.7	74.6	103.6	75.2	54
37	96.6	72.8	97.4	73.4	98.2	74.0	99.0	74.6	99.8	75.2	100.6	75.8	101.4	76.4	102.2	77.0	53
38	95.3	74.5	96.1	75.1	96.9	75.7	97.7	76.3	98.5	77.0	99.3	77.6	100.1	78.2	100.9	78.8	52
39	94.0	76.1	94.8	76.8	95.6	77.4	96.4	78.0	97.1	78.7	97.9	79.3	98.7	79.9	99.5	80.6	51
40	92.7	77.8	93.5	78.4	94.2	79.1	95.0	79.7	95.8	80.3	96.5	81.0	97.3	81.6	98.1	82.3	50
41	91.3	79.4	92.1	80.0	92.8	80.7	93.6	81.4	94.3	82.0	95.1	82.7	95.8	83.3	96.6	84.0	49
42	89.9	81.0	90.7	81.6	91.4	82.3	92.1	83.0	92.9	83.6	93.6	84.3	94.4	85.0	95.1	85.6	48
43	88.5	82.5	89.2	83.2	90.0	83.9	90.7	84.6	91.4	85.2	92.2	85.9	92.9	86.6	93.6	87.3	47
44	87.0	84.1	87.8	84.7	88.5	85.4	89.2	86.1	89.9	86.8	90.6	87.5	91.4	88.2	92.1	88.9	46
45	85.6	85.6	86.3	86.3	87.0	87.0	87.7	87.7	88.4	88.4	89.1	89.1	89.8	89.8	90.5	90.5	45
Cras.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Cras.

Traverse Table.

Distance	129		130		131		132		133		134		135		136		
Course	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Course
Pts.																	Pts.
¼	128.8	06.3	129.8	06.4	130.8	06.4	131.8	06.5	132.8	06.5	133.8	06.6	134.8	06.6	135.8	06.7	¾
½	128.4	12.6	129.4	12.7	130.4	12.8	131.4	12.9	132.4	13.0	133.4	13.1	134.3	13.2	135.3	13.3	½
¾	127.6	18.9	128.6	19.1	129.6	19.2	130.6	19.4	131.6	19.5	132.5	19.7	133.5	19.8	134.5	20.0	¼
1	126.5	25.2	127.5	25.4	128.5	25.6	129.5	25.8	130.4	26.0	131.4	26.1	132.4	26.3	133.4	26.5	7
¼	125.1	31.3	126.1	31.6	127.1	31.8	128.0	32.1	129.0	32.3	130.0	32.6	131.0	32.8	131.9	33.0	¾
½	123.5	37.4	124.4	37.7	125.4	38.0	126.3	38.3	127.3	38.6	128.2	38.9	129.2	39.2	130.1	39.5	½
¾	121.5	43.5	122.4	43.8	123.3	44.1	124.3	44.5	125.2	44.8	126.2	45.1	127.1	45.5	128.0	45.8	¼
2	119.2	49.4	120.1	49.8	121.0	50.1	122.0	50.5	122.9	50.9	123.8	51.3	124.7	51.7	125.7	52.0	6
¼	116.6	55.2	117.5	55.6	118.4	56.0	119.3	56.4	120.2	56.9	121.1	57.3	122.0	57.7	122.9	58.2	¾
½	113.8	60.8	114.7	61.3	115.5	61.7	116.4	62.2	117.3	62.7	118.2	63.2	119.1	63.6	119.9	64.1	½
¾	110.6	66.3	111.5	66.8	112.4	67.3	113.2	67.9	114.1	68.4	114.9	68.9	115.8	69.4	116.6	69.9	¼
3	107.3	71.7	108.1	72.2	108.9	72.8	109.7	73.3	110.6	73.9	111.4	74.4	112.2	75.0	113.1	75.6	5
¼	103.6	76.9	104.4	77.4	105.2	78.0	106.0	78.6	106.8	79.2	107.6	79.8	108.4	80.4	109.2	81.0	¾
½	99.7	81.8	100.5	82.5	101.3	83.1	102.0	83.7	102.8	84.4	103.6	85.0	104.4	85.6	105.1	86.3	½
¾	95.6	86.6	96.3	87.3	97.1	88.0	97.8	88.6	98.5	89.3	99.3	90.0	100.0	90.7	100.8	91.3	¼
4	91.2	91.2	91.9	91.9	92.6	92.6	93.3	93.3	94.0	94.0	94.8	94.8	95.5	95.5	96.2	96.2	4
1°	129.0	02.3	130.0	02.3	131.0	02.3	132.0	02.3	133.0	02.3	134.0	02.3	135.0	02.4	136.0	02.4	89°
2	128.9	04.5	129.9	04.5	130.9	04.6	131.9	04.6	132.9	04.6	133.9	04.7	134.9	04.7	135.9	04.7	88
3	128.8	06.8	129.8	06.8	130.8	06.9	131.8	06.9	132.8	07.0	133.8	07.0	134.8	07.1	135.8	07.1	87
4	128.7	09.0	129.7	09.1	130.7	09.1	131.7	09.2	132.7	09.3	133.7	09.3	134.7	09.4	135.7	09.5	86
5	128.5	11.2	129.5	11.3	130.5	11.4	131.5	11.5	132.5	11.6	133.5	11.7	134.5	11.8	135.5	11.9	85
6	128.3	13.5	129.3	13.6	130.3	13.7	131.3	13.8	132.3	13.9	133.3	14.0	134.3	14.1	135.3	14.2	84
7	128.0	15.7	129.0	15.8	130.0	16.0	131.0	16.1	132.0	16.2	133.0	16.3	134.0	16.5	135.0	16.6	83
8	127.7	18.0	128.7	18.1	129.7	18.2	130.7	18.4	131.7	18.5	132.7	18.6	133.7	18.8	134.7	18.9	82
9	127.4	20.2	128.4	20.3	129.4	20.5	130.4	20.6	131.4	20.8	132.4	21.0	133.3	21.1	134.3	21.3	81
10	127.0	22.4	128.0	22.6	129.0	22.7	130.0	22.9	131.0	23.1	132.0	23.3	132.9	23.4	133.9	23.6	80
11	126.6	24.6	127.6	24.8	128.6	25.0	129.6	25.2	130.6	25.4	131.5	25.6	132.5	25.8	133.5	26.0	79
12	126.2	26.8	127.2	27.0	128.1	27.2	129.1	27.4	130.1	27.7	131.1	27.9	132.0	28.1	133.0	28.3	78
13	125.7	29.0	126.7	29.2	127.6	29.5	128.6	29.7	129.6	29.9	130.6	30.1	131.5	30.4	132.5	30.6	77
14	125.2	31.2	126.1	31.4	127.1	31.7	128.1	31.9	129.0	32.2	130.0	32.4	131.0	32.7	132.0	32.9	76
15	124.6	33.4	125.6	33.6	126.5	33.9	127.5	34.2	128.5	34.4	129.4	34.7	130.4	34.9	131.4	35.2	75
16	124.0	35.6	125.0	35.8	125.9	36.1	126.9	36.4	127.8	36.7	128.8	36.9	129.8	37.2	130.7	37.5	74
17	123.4	37.7	124.3	38.0	125.3	38.3	126.2	38.6	127.2	38.9	128.1	39.2	129.1	39.5	130.1	39.8	73
18	122.7	39.9	123.6	40.2	124.6	40.5	125.5	40.8	126.5	41.1	127.4	41.4	128.4	41.7	129.3	42.0	72
19	122.0	42.0	122.9	42.3	123.9	42.6	124.8	43.0	125.8	43.3	126.7	43.6	127.6	44.0	128.6	44.3	71
20	121.2	44.1	122.2	44.5	123.1	44.8	124.0	45.1	125.0	45.5	125.9	45.8	126.9	46.2	127.8	46.5	70
21	120.4	46.2	121.4	46.6	122.3	46.9	123.2	47.3	124.2	47.7	125.1	48.0	126.0	48.4	127.0	48.7	69
22	119.6	48.3	120.5	48.7	121.5	49.1	122.4	49.4	123.3	49.8	124.2	50.2	125.2	50.6	126.1	50.9	68
23	118.7	50.4	119.7	50.8	120.6	51.2	121.5	51.6	122.4	52.0	123.3	52.4	124.3	52.7	125.2	53.1	67
24	117.8	52.5	118.8	52.9	119.7	53.3	120.6	53.7	121.5	54.1	122.4	54.5	123.3	54.9	124.2	55.3	66
25	116.9	54.5	117.8	54.9	118.7	55.4	119.6	55.8	120.5	56.2	121.4	56.6	122.4	57.1	123.3	57.5	65
26	115.9	56.5	116.8	57.0	117.7	57.4	118.6	57.9	119.5	58.3	120.4	58.7	121.3	59.2	122.2	59.6	64
27	114.9	58.6	115.8	59.0	116.7	59.5	117.6	59.9	118.5	60.4	119.4	60.8	120.3	61.3	121.2	61.7	63
28	113.9	60.6	114.8	61.0	115.7	61.5	116.5	62.0	117.4	62.4	118.3	62.9	119.2	63.4	120.1	63.8	62
29	112.8	62.5	113.7	63.0	114.6	63.5	115.4	64.0	116.3	64.5	117.2	65.0	118.1	65.4	118.9	65.9	61
30	111.7	64.5	112.6	65.0	113.4	65.5	114.3	66.0	115.2	66.5	116.0	67.0	116.9	67.5	117.8	68.0	60
31	110.6	66.4	111.4	67.0	112.3	67.5	113.1	68.0	114.0	68.5	114.9	69.0	115.7	69.5	116.6	70.0	59
32	109.4	68.4	110.2	68.9	111.1	69.4	111.9	69.9	112.8	70.5	113.6	71.0	114.5	71.5	115.3	72.1	58
33	108.2	70.3	109.0	70.8	109.9	71.3	110.7	71.9	111.5	72.4	112.4	73.0	113.2	73.5	114.1	74.1	57
34	106.9	72.1	107.8	72.7	108.6	73.3	109.4	73.8	110.3	74.4	111.1	74.9	111.9	75.5	112.7	76.1	56
35	105.7	74.0	106.5	74.6	107.3	75.1	108.1	75.7	108.9	76.3	109.8	76.9	110.6	77.4	111.4	78.0	55
36	104.4	75.8	105.2	76.4	106.0	77.0	106.8	77.6	107.6	78.2	108.4	78.8	109.2	79.4	110.0	79.9	54
37	103.0	77.6	103.8	78.2	104.6	78.8	105.4	79.4	106.2	80.0	107.0	80.6	107.8	81.2	108.6	81.8	53
38	101.7	79.4	102.4	80.0	103.2	80.7	104.0	81.3	104.8	81.9	105.6	82.5	106.4	83.1	107.2	83.7	52
39	100.3	81.2	101.0	81.8	101.8	82.4	102.6	83.1	103.4	83.7	104.1	84.3	101.9	85.0	105.7	85.6	51
40	98.8	82.9	99.6	83.6	100.4	84.2	101.1	84.8	101.9	85.5	102.6	86.1	103.4	86.8	104.2	87.4	50
41	97.4	84.6	98.1	85.3	98.9	85.9	99.6	86.6	100.4	87.3	101.1	87.9	101.9	88.6	102.6	89.2	49
42	95.9	86.3	96.6	87.0	97.4	87.7	98.1	88.3	98.8	89.0	99.6	89.7	100.3	90.3	101.1	91.0	48
43	94.3	88.0	95.1	88.7	95.8	89.3	96.5	90.0	97.3	90.7	98.0	91.4	98.7	92.1	99.5	92.8	47
44	92.8	89.6	93.5	90.3	94.2	91.0	95.0	91.7	95.7	92.4	96.4	93.1	97.1	93.8	97.8	94.5	46
45	91.2	91.2	91.9	91.9	92.6	92.6	93.3	93.3	94.0	94.0	94.8	94.8	95.5	95.5	96.2	96.2	45
Course	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Course

TABLE 3.

Traverse Table

	137		138		139		140		141		142		143	
	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.
1	136.8	06.7	137.8	06.8	138.8	06.8	139.8	06.9	140.8	06.9	141.8	07.0	142.8	07.
	136.3	13.4	137.3	13.5	138.3	13.6	139.3	13.7	140.3	13.8	141.3	13.9	142.3	14.
	135.5	20.1	136.5	20.2	137.5	20.4	138.5	20.5	139.5	20.7	140.5	20.8	141.4	21.
	134.4	26.7	135.3	26.9	136.3	27.1	137.3	27.3	138.3	27.5	139.3	27.7	140.2	27.
	132.9	33.3	133.9	33.5	134.8	33.8	135.8	34.0	136.8	34.3	137.7	34.5	138.7	34.
	131.1	39.8	132.1	40.1	133.0	40.3	134.0	40.6	134.9	40.9	135.9	41.2	136.8	41.
	129.0	46.1	129.9	46.5	130.9	46.8	131.8	47.2	132.8	47.5	133.7	47.8	134.6	48.
2	126.6	52.4	127.5	52.8	128.4	53.2	129.3	53.6	130.3	54.0	131.2	54.3	132.1	54.
	123.8	58.6	124.7	59.0	125.7	59.4	126.6	59.9	127.5	60.3	128.4	60.7	129.3	61.
	120.8	64.6	121.7	65.0	122.6	65.5	123.5	66.0	124.4	66.5	125.2	66.9	126.1	67.
	117.5	70.4	118.4	70.9	119.2	71.5	120.1	72.0	120.9	72.5	121.8	73.0	122.7	73.
3	113.9	76.1	114.7	76.7	115.6	77.2	116.4	77.8	117.2	78.3	118.1	78.9	118.9	79.
	110.0	81.6	110.8	82.2	111.6	82.8	112.4	83.4	113.2	84.0	114.0	84.6	114.9	85.
	105.9	86.9	106.7	87.5	107.4	88.2	108.2	88.8	109.0	89.4	109.8	90.1	110.5	90.
	101.5	92.0	102.2	92.7	103.0	93.3	103.7	94.0	104.5	94.7	105.2	95.4	106.0	96.
4	96.9	96.9	97.6	97.6	98.3	98.3	99.0	99.0	99.7	99.7	100.4	100.4	101.1	101.

1	137.0	02.4	138.0	02.4	139.0	02.4	140.0	02.4	141.0	02.5	142.0	02.5	143.0	02.
2	136.9	04.8	137.9	04.8	138.9	04.9	139.9	04.9	140.9	04.9	141.9	05.0	142.9	05.
3	136.8	07.2	137.8	07.2	138.8	07.3	139.8	07.3	140.8	07.4	141.8	07.4	142.8	07.
4	136.7	09.6	137.7	09.6	138.7	09.7	139.7	09.8	140.7	09.8	141.7	09.9	142.7	10.
5	136.5	11.9	137.5	12.0	138.5	12.1	139.5	12.2	140.5	12.3	141.5	12.4	142.5	12.
6	136.2	14.3	137.2	14.4	138.2	14.5	139.2	14.6	140.2	14.7	141.2	14.8	142.2	14.
7	136.0	16.7	137.0	16.8	138.0	16.9	139.0	17.1	139.9	17.2	140.9	17.3	141.9	17.
8	135.7	19.1	136.7	19.2	137.7	19.3	138.6	19.5	139.6	19.6	140.6	19.8	141.6	19.
9	135.3	21.4	136.3	21.6	137.3	21.7	138.3	21.9	139.3	22.1	140.3	22.2	141.2	22.
10	134.9	23.8	135.9	24.0	136.9	24.1	137.9	24.3	138.9	24.5	139.8	24.7	140.8	24.
11	134.5	26.1	135.5	26.3	136.4	26.5	137.4	26.7	138.4	26.9	139.4	27.1	140.4	27.
12	134.0	28.5	135.0	28.7	136.0	28.9	136.9	29.1	137.9	29.3	138.9	29.5	139.9	29.
13	133.5	30.8	134.5	31.0	135.4	31.3	136.4	31.5	137.4	31.7	138.4	31.9	139.3	32.
14	132.9	33.1	133.9	33.4	134.9	33.6	135.8	33.9	136.8	34.1	137.8	34.4	138.8	34.
15	132.3	35.5	133.3	35.7	134.3	36.0	135.2	36.2	136.2	36.5	137.2	36.8	138.1	37.
16	131.7	37.8	132.7	38.0	133.6	38.3	134.6	38.6	135.5	38.9	136.5	39.1	137.5	39.
17	131.0	40.1	132.0	40.3	132.9	40.6	133.9	40.9	134.8	41.2	135.8	41.5	136.8	41.
18	130.3	42.3	131.2	42.6	132.2	43.0	133.1	43.3	134.1	43.6	135.1	43.9	136.0	44.
19	129.5	44.6	130.5	44.9	131.4	45.3	132.4	45.6	133.3	45.9	134.3	46.2	135.2	46.
20	128.7	46.9	129.7	47.2	130.6	47.5	131.6	47.9	132.5	48.2	133.4	48.6	134.4	48.
21	127.9	49.1	128.8	49.5	129.8	49.8	130.7	50.2	131.6	50.5	132.6	50.9	133.5	51.
22	127.0	51.3	128.0	51.7	128.9	52.1	129.8	52.4	130.7	52.8	131.7	53.2	132.6	53.
23	126.1	53.5	127.0	53.9	128.0	54.3	128.9	54.7	129.8	55.1	130.7	55.5	131.6	55.
24	125.2	55.7	126.1	56.1	127.0	56.5	127.9	56.9	128.8	57.3	129.7	57.8	130.6	58.
25	124.2	57.9	125.1	58.3	126.0	58.7	126.9	59.2	127.8	59.6	128.7	60.0	129.6	60.
26	123.1	60.1	124.0	60.5	124.9	60.9	125.8	61.4	126.7	61.8	127.6	62.2	128.5	62.
27	122.1	62.2	123.0	62.7	123.8	63.1	124.7	63.6	125.6	64.0	126.5	64.5	127.4	64.
28	121.0	64.3	121.8	64.8	122.7	65.3	123.6	65.7	124.5	66.2	125.4	66.7	126.3	67.
29	119.8	66.4	120.7	66.9	121.6	67.4	122.4	67.9	123.3	68.4	124.2	68.8	125.1	69.
30	118.6	68.5	119.5	69.0	120.4	69.5	121.2	70.0	122.1	70.5	123.0	71.0	123.8	71.
31	117.4	70.6	118.3	71.1	119.1	71.6	120.0	72.1	120.9	72.6	121.7	73.1	122.6	73.
32	116.2	72.6	117.0	73.1	117.9	73.7	118.7	74.2	119.6	74.7	120.4	75.2	121.3	75.
33	114.9	74.6	115.7	75.2	116.6	75.7	117.4	76.2	118.3	76.8	119.1	77.3	119.9	77.
34	113.6	76.6	114.4	77.2	115.2	77.7	116.1	78.3	116.9	78.8	117.7	79.4	118.6	80.
35	112.2	78.6	113.0	79.2	113.9	79.7	114.7	80.3	115.5	80.9	116.3	81.4	117.1	82.
36	110.8	80.5	111.6	81.1	112.5	81.7	113.3	82.3	114.1	82.9	114.9	83.5	115.7	84.
37	109.4	82.4	110.2	83.1	111.0	83.7	111.8	84.3	112.6	84.9	113.4	85.5	114.2	86.
38	108.0	84.3	108.7	85.0	109.5	85.6	110.3	86.2	111.1	86.8	111.9	87.4	112.7	88.
39	106.5	86.2	107.2	86.8	108.0	87.5	108.8	88.1	109.6	88.7	110.4	89.4	111.1	90.
40	104.9	88.1	105.7	88.7	106.5	89.3	107.2	90.0	108.0	90.6	108.8	91.3	109.5	91.
41	103.4	89.9	104.1	90.5	104.9	91.2	105.7	91.8	106.4	92.5	107.2	93.2	107.9	93.
42	101.8	91.7	102.6	92.3	103.3	93.0	104.0	93.7	104.8	94.3	105.5	95.0	106.3	95.
43	100.2	93.4	100.9	94.1	101.7	94.8	102.4	95.5	103.1	96.2	103.9	96.8	104.6	97.
44	98.5	95.2	99.3	95.9	100.0	96.6	100.7	97.3	101.4	97.9	102.1	98.6	102.9	99.
45	96.9	96.9	97.6	97.6	98.3	98.3	99.0	99.0	99.7	99.7	100.4	100.4	101.1	101.
Dist.	Dep.	Diff Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.La

Traverse Table.

Distance.	145		146		147		148		149		150		151		152		
Crse.	Diff.Lat	Dep.	Diff.Lat	Dep.	Diff.Lat	Dep.	Diff.Lat	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Crse.
Pts.																	Pts.
¼	144.8	07.1	145.8	07.2	146.8	07.2	147.8	07.3	148.8	07.3	149.8	07.4	150.8	07.4	151.8	07.5	7¾
½	144.3	14.2	145.3	14.3	146.3	14.4	147.3	14.5	148.3	14.6	149.3	14.7	150.3	14.8	151.3	14.9	½
¾	143.4	21.3	144.4	21.4	145.4	21.6	146.4	21.7	147.4	21.9	148.4	22.0	149.4	22.2	150.3	22.3	¼
1	142.2	28.3	143.2	28.5	144.2	28.7	145.2	28.9	146.1	29.1	147.1	29.3	148.1	29.5	149.1	29.7	7
¼	140.7	35.2	141.6	35.5	142.6	35.7	143.6	36.0	144.5	36.2	145.5	36.5	146.5	36.7	147.4	36.9	¾
½	138.8	42.1	139.7	42.4	140.7	42.7	141.6	43.0	142.6	43.2	143.5	43.5	144.5	43.8	145.5	44.1	½
¾	136.5	48.8	137.5	49.2	138.4	49.5	139.3	49.9	140.3	50.2	141.2	50.5	142.2	50.9	143.1	51.2	¼
2	134.0	55.5	134.9	55.9	135.8	56.3	136.7	56.6	137.7	57.0	138.6	57.4	139.5	57.8	140.4	58.2	6
¼	131.1	62.0	132.0	62.4	132.9	62.9	133.8	63.3	134.7	63.7	135.6	64.1	136.5	64.6	137.4	65.0	¾
½	127.9	68.5	128.8	68.8	129.6	69.3	130.5	69.8	131.4	70.2	132.3	70.7	133.2	71.2	134.1	71.6	½
¾	124.4	74.5	125.2	75.1	126.1	75.6	126.9	76.1	127.8	76.6	128.7	77.1	129.5	77.6	130.4	78.1	¼
3	120.6	80.6	121.4	81.1	122.2	81.7	123.1	82.2	123.9	82.8	124.7	83.3	125.5	83.9	126.4	84.4	5
¼	116.5	86.4	117.3	87.0	118.1	87.6	118.9	88.2	119.7	88.8	120.5	89.4	121.3	90.0	122.1	90.5	¾
½	112.1	92.0	112.9	92.6	113.6	93.3	114.4	93.9	115.2	94.5	115.9	95.2	116.7	95.8	117.5	96.4	½
¾	107.4	97.4	108.2	98.0	108.9	98.7	109.7	99.4	110.4	100.1	111.1	100.7	111.9	101.4	112.6	102.1	¼
4	102.5	102.5	103.2	103.2	103.9	103.9	104.7	104.7	105.4	105.4	106.1	106.1	106.8	106.8	107.5	107.5	4
1°	145.0	02.5	146.0	02.5	147.0	02.6	148.0	02.6	149.0	02.6	150.0	02.6	151.0	02.6	152.0	02.7	89°
2	144.9	05.1	145.9	05.1	146.9	05.1	147.9	05.2	148.9	05.2	149.9	05.2	150.9	05.3	151.9	05.3	88
3	144.8	07.6	145.8	07.6	146.8	07.7	147.8	07.7	148.8	07.8	149.8	07.9	150.8	07.9	151.8	08.0	87
4	144.6	10.1	145.6	10.2	146.6	10.3	147.6	10.3	148.6	10.4	149.6	10.5	150.6	10.5	151.6	10.6	86
5	144.4	12.6	145.4	12.7	146.4	12.8	147.4	12.9	148.4	13.0	149.4	13.1	150.4	13.2	151.4	13.2	85
6	144.2	15.2	145.2	15.3	146.2	15.4	147.2	15.5	148.2	15.6	149.2	15.7	150.2	15.8	151.2	15.9	84
7	143.9	17.7	144.9	17.8	145.9	17.9	146.9	18.0	147.9	18.2	148.9	18.3	149.9	18.4	150.9	18.5	83
8	143.6	20.2	144.6	20.3	145.6	20.5	146.6	20.6	147.5	20.7	148.5	20.9	149.5	21.0	150.5	21.2	82
9	143.2	22.7	144.2	22.8	145.2	23.0	146.2	23.2	147.2	23.3	148.2	23.5	149.1	23.6	150.1	23.8	81
10	142.8	25.2	143.8	25.4	144.8	25.5	145.8	25.7	146.7	25.9	147.7	26.0	148.7	26.2	149.7	26.4	80
11	142.3	27.7	143.3	27.9	144.3	28.0	145.3	28.2	146.3	28.4	147.2	28.6	148.2	28.8	149.2	29.0	79
12	141.8	30.1	142.8	30.4	143.8	30.6	144.8	30.8	145.7	31.0	146.7	31.2	147.7	31.4	148.7	31.6	78
13	141.3	32.6	142.3	32.8	143.2	33.1	144.2	33.3	145.2	33.5	146.2	33.7	147.1	34.0	148.1	34.2	77
14	140.7	35.1	141.7	35.3	142.6	35.6	143.6	35.8	144.6	36.0	145.5	36.3	146.5	36.5	147.5	36.8	76
15	140.1	37.5	141.0	37.8	142.0	38.0	143.0	38.3	143.9	38.6	144.9	38.8	145.9	39.1	146.8	39.3	75
16	139.4	40.0	140.3	40.2	141.3	40.5	142.3	40.8	143.2	41.1	144.2	41.3	145.2	41.6	146.1	41.9	74
17	138.7	42.4	139.6	42.7	140.6	43.0	141.5	43.3	142.5	43.6	143.4	43.9	144.4	44.1	145.4	44.4	73
18	137.9	44.8	138.9	45.1	139.8	45.4	140.8	45.7	141.7	46.0	142.7	46.4	143.6	46.7	144.6	47.0	72
19	137.1	47.2	138.0	47.5	139.0	47.9	139.9	48.2	140.9	48.5	141.8	48.8	142.8	49.2	143.7	49.5	71
20	136.3	49.6	137.2	49.9	138.1	50.3	139.1	50.6	140.0	51.0	141.0	51.3	141.9	51.6	142.8	52.0	70
21	135.4	52.0	136.3	52.3	137.2	52.7	138.2	53.0	139.1	53.4	140.0	53.8	141.0	54.1	141.9	54.5	69
22	134.4	54.3	135.4	54.7	136.3	55.1	137.2	55.4	138.2	55.8	139.1	56.2	140.0	56.6	140.9	56.9	68
23	133.5	56.7	134.4	57.0	135.3	57.4	136.2	57.8	137.2	58.2	138.1	58.6	139.0	59.0	139.9	59.4	67
24	132.5	59.0	133.4	59.4	134.3	59.8	135.2	60.2	136.1	60.6	137.0	61.0	137.9	61.4	138.9	61.8	66
25	131.4	61.3	132.3	61.7	133.2	62.1	134.1	62.5	135.0	63.0	135.9	63.4	136.9	63.8	137.8	64.2	65
26	130.3	63.6	131.2	64.0	132.1	64.4	133.0	64.9	133 9	65.3	134.8	65.8	135.7	66.2	136.6	66.6	64
27	129.2	65.8	130.1	66.3	131.0	66.7	131.9	67.2	132.8	67.6	133.7	68.1	134.5	68.6	135.4	69.0	63
28	128.0	68.1	128.9	68.5	129.8	69.0	130.7	69.5	131.6	70.0	132.4	70.4	133.3	70.9	134.2	71.4	62
29	126.8	70.3	127.7	70.8	128.6	71.3	129.4	71.8	130.3	72.2	131.2	72.7	132.1	73.2	132.9	73.7	61
30	125.6	72.5	126.4	73.0	127.3	73.5	128.2	74.0	129.0	74.5	129.9	75.0	130.8	75.5	131.6	76.0	60
31	124.3	74.7	125.1	75.2	126.0	75.7	126.9	76.2	127.7	76.7	128.6	77.3	129.4	77.8	130.3	78.3	59
32	123.0	76.8	123.8	77.4	124.7	77.9	125.5	78.4	126.4	79.0	127.2	79.5	128.1	80.0	128.9	80.5	58
33	121.6	79.0	122.4	79.5	123.3	80.1	124.1	80.6	125.0	81.2	125.8	81.7	126.6	82.2	127.5	82.8	57
34	120.2	81.1	121.0	81.6	121.9	82.2	122.7	82.8	123.5	83.3	124.4	83.9	125.2	84.4	126.0	85.0	56
35	118.8	83.2	119.6	83.7	120.4	84.3	121.2	84.9	122.1	85.5	122.9	86.0	123.7	86.6	124.5	87.2	55
36	117.3	85.2	118.1	85.8	118.9	86.4	119.7	87.0	120.5	87.6	121.4	88.2	122.2	88.8	123.0	89.3	54
37	115.8	87.3	116.6	87.9	117.4	88.5	118.2	89.1	119.0	89.7	119.8	90.3	120.6	90.9	121.4	91.5	53
38	114.3	89.3	115.0	89.9	115.8	90.5	116.6	91.1	117.4	91.7	118.2	92.3	119.0	93.0	119.8	93.6	52
39	112.7	91.3	113.5	91.9	114.2	92.5	115.0	93.1	115.8	93.8	116.6	94.4	117.3	95.0	118.1	95.7	51
40	111.1	93.2	111.8	93.8	112.6	94.5	113.4	95.1	114.1	95.8	114.9	96.4	115.7	97.1	116.4	97.7	50
41	109.4	95.1	110.2	95.8	110.9	96.4	111.7	97.1	112.5	97.8	113.2	98.4	114.0	99.1	114.7	99.7	49
42	107.8	97.0	108.5	97.7	109.2	98.4	110.0	99.0	110.7	99.7	111.5	100.4	112.2	101.0	113.0	101.7	48
43	106.0	98.9	106.8	99.6	107.5	100.3	108.2	100.9	109.0	101.6	109.7	102.3	110.4	103.0	111.2	103.7	47
44	104.3	100.7	105.0	101.4	105.7	102.1	106.5	102.8	107.2	103.5	107.9	104.2	108.6	104.9	109.3	105.6	46
45	102.5	102.5	103.2	103.2	103.9	103.9	104.7	104.7	105.4	105.4	106.1	106.1	106.8	106.8	107.5	107.5	45
Crse.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Crse.

Traverse Table.

Distance.	153		154		155		156		157		158		159		160		
Cnse.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Cnse
Pts.																	Pts.
¼	152.8	07.5	153.8	07.6	154.8	07.6	155.8	07.7	156.8	07.7	157.8	07.8	158.8	07.8	159.8	07.9	75
½	152.3	15.0	153.3	15.1	154.3	15.2	155.2	15.3	156.2	15.4	157.2	15.5	158.2	15.6	159.2	15.7	½
¾	151.3	22.4	152.3	22.6	153.3	22.7	154.3	22.9	155.3	23.0	156.3	23.2	157.3	23.3	158.3	23.5	¼
1	150.1	29.9	151.0	30.0	152.0	30.2	153.0	30.4	154.0	30.6	155.0	30.8	155.9	31.0	156.9	31.2	7
¼	148.4	37.2	149.4	37.4	150.4	37.7	151.3	37.9	152.3	38.2	153.3	38.4	154.2	38.6	155.2	38.9	¾
½	146.4	44.4	147.4	44.7	148.3	45.0	149.3	45.3	150.2	45.6	151.2	45.9	152.2	46.1	153.1	46.4	½
¾	144.1	51.5	145.0	51.9	145.9	52.2	146.9	52.5	147.8	52.9	148.8	53.2	149.7	53.6	150.6	53.9	¼
2	141.4	58.6	142.3	58.9	143.2	59.3	144.1	59.7	145.1	60.1	146.0	60.5	146.9	60.9	147.8	61.2	6
¼	138.3	65.4	139.2	65.9	140.1	66.3	141.0	66.7	141.9	67.1	142.8	67.6	143.7	68.0	144.6	68.4	¾
½	134.9	72.1	135.8	72.6	136.7	73.1	137.6	73.5	138.5	74.0	139.3	74.5	140.2	74.9	141.1	75.4	½
¾	131.2	78.7	132.1	79.2	132.9	79.7	133.8	80.2	134.7	80.7	135.5	81.2	136.4	81.7	137.2	82.3	¼
3	127.2	85.0	128.0	85.6	128.9	86.1	129.7	86.7	130.5	87.2	131.4	87.8	132.2	88.3	133.0	88.9	5
¼	122.9	91.1	123.7	91.7	124.5	92.3	125.3	92.9	126.1	93.5	126.9	94.1	127.7	94.7	128.5	95.3	¾
½	118.3	97.1	119.0	97.7	119.8	98.3	120.6	99.0	121.4	99.6	122.1	100.2	122.9	100.9	123.7	101.5	½
¾	113.4	102.7	114.1	103.4	114.8	104.1	115.6	104.8	116.3	105.4	117.1	106.1	117.8	106.8	118.5	107.4	¼
4	108.2	108.2	108.9	108.9	109.6	109.6	110.3	110.3	111.0	111.0	111.7	111.7	112.4	112.4	113.1	113.1	4
1°	153.0	02.7	154.0	02.7	155.0	02.7	156.0	02.7	157.0	02.7	158.0	02.8	159.0	02.8	160 0	02.8	89°
2	152.9	05.3	153.9	05.4	154.9	05.4	155.9	05.4	156.9	05.5	157.9	05.5	158.9	05.5	159.9	05.6	88
3	152.8	08.0	153.8	08.1	154.8	08.1	155.8	08.2	156.8	08.2	157.8	08.3	158 8	08.3	159.8	08.4	87
4	152.6	10.7	153.6	10.7	154.6	10.8	155.6	10.9	156.6	11.0	157.6	11.0	158.6	11.1	159.6	11.2	86
5	152.4	13.3	153.4	13.4	154.4	13.5	155.4	13.6	156.4	13.7	157.4	13.8	158.4	13.9	159.4	13.9	85
6	152.2	16.0	153.2	16.1	154.2	16.2	155.1	16.3	156.1	16.4	157.1	16.5	158.1	16.6	159.1	16.7	84
7	151.9	18.6	152.9	18.8	153.8	18.9	154.8	19.0	155.8	19.1	156.8	19.3	157.8	19.4	158.8	19.5	83
8	151.5	21.3	152.5	21.4	153.5	21.6	154.5	21.7	155.5	21.9	156.5	22.0	157.5	22.1	158.4	22.3	82
9	151.1	23.9	152.1	24.1	153.1	24.2	154.1	24.4	155.1	24.6	156.1	24.7	157.0	24.9	158.0	25.0	81
10	150.7	26.6	151.7	26.7	152.6	26.9	153.6	27.1	154.6	27.3	155.6	27.4	156.6	27.6	157.6	27.8	80
11	150.2	29.2	151.2	29.4	152.2	29.6	153.1	29.8	154.1	30.0	155.1	30.1	156.1	30.3	157.1	30.5	79
12	149.7	31.8	150.6	32.0	151.6	32.2	152.6	32.4	153.6	32.6	154.5	32.9	155.5	33.1	156.5	33.3	78
13	149.1	34.4	150.1	34.6	151.0	34.9	152.0	35.1	153.0	35.3	154.0	35.5	154.9	35.8	155.9	36.0	77
14	148.5	37.0	149.4	37.3	150.4	37.5	151.4	37.7	152.3	38.0	153.3	38.2	154.3	38.5	155.2	38.7	76
15	147.8	39.6	148.8	39.9	149.7	40.1	150.7	40.4	151.7	40.6	152.6	40.9	153.6	41.2	154.5	41.4	75
16	147.1	42.2	148.0	42.4	149.0	42.7	150.0	43.0	150.9	43.3	151.9	43.6	152.8	43.8	153.8	44.1	74
17	146.3	44.7	147.3	45.0	148.2	45.3	149.2	45.6	150.1	45.9	151.1	46.2	152.1	46.5	153.0	46.8	73
18	145.5	47.3	146.5	47.6	147.4	47.9	148.4	48.2	149.3	48.5	150.3	48.8	151.2	49.1	152.2	49.4	72
19	144.7	49.8	145.6	50.1	146.6	50.5	147.5	50.8	148.4	51.1	149.4	51.4	150.3	51.8	151.3	52.1	71
20	143.8	52.3	144.7	52.7	145.7	53.0	146.6	53.4	147.5	53.7	148.5	54.0	149.4	54.4	150.4	54.7	70
21	142.8	54.8	143.8	55.2	144.7	55.5	145.6	55.9	146.6	56.3	147.5	56.6	148.4	57.0	149.4	57.3	69
22	141.9	57.3	142.8	57.7	143.7	58.1	144.6	58.4	145.6	58.8	146.5	59.2	147.4	59.6	148.3	59.9	68
23	140.8	59.8	141.8	60.2	142.7	60.6	143.6	61.0	144.5	61.3	145.4	61.7	146.4	62.1	147.3	62.5	67
24	139.8	62.2	140.7	62.6	141.6	63.0	142.5	63.5	143.4	63.9	144.3	64.3	145.3	64.7	146.2	65.1	66
25	138.7	64.7	139.6	65.1	140.5	65.5	141.4	65.9	142.3	66.4	143.2	66.8	144.1	67.2	145.0	67.6	65
26	137.5	67.1	138.4	67.5	139.3	67.9	140.2	68.4	141.1	68.8	142.0	69.3	142.9	69.7	143.8	70.1	64
27	136.3	69.5	137.2	69.9	138.1	70.4	139.0	70.8	139.9	71.3	140.8	71.7	141.7	72.2	142.6	72.6	63
28	135.1	71.8	136.0	72.3	136.9	72.8	137.7	73.2	138.6	73.7	139.5	74.2	140.4	74.6	141.3	75.1	62
29	133.8	74.2	134.7	74.7	135.6	75.1	136.4	75.6	137.3	76.1	138.2	76.6	139.1	77.1	139.9	77.6	61
30	132.5	76.5	133.4	77.0	134.2	77.5	135.1	78.0	136 0	78.5	136.8	79.0	137.7	79.5	138.6	80.0	60
31	131.1	78.8	132.0	79.3	132.9	79.8	133.7	80.3	134.6	80.9	135.4	81.4	136.3	81.9	137.1	82.4	59
32	129.8	81.1	130.6	81.6	131.4	82.1	132.3	82.7	133.1	83.2	134.0	83.7	134.8	84.3	135.7	84.8	58
33	128.3	83.3	129.2	83.9	130.0	84.4	130.8	85.0	131.7	85.5	132.5	86.1	133.3	86.6	134.2	87.1	57
34	126.8	85.6	127.7	86.1	128.5	86.7	129.3	87.2	130.2	87.8	131.0	88.4	131.8	88.9	132.6	89.5	56
35	125.3	87.8	126.1	88.3	127.0	88.9	127.8	89.5	128.6	90.1	129.4	90.6	130.2	91.2	131.1	91.8	55
36	123.8	89.9	124.6	90.5	125.4	91.1	126.2	91.7	127.0	92.3	127.8	92.9	128.6	93.5	129.4	94.0	54
37	122.2	92.1	123.0	92.7	123.8	93.3	124.6	93.9	125.4	94.5	126.2	95.1	127.0	95.7	127.8	96.3	53
38	120.6	94.2	121.4	94.8	122.1	95.4	122.9	96.0	123.7	96.7	124.5	97.3	125.3	97.9	126.1	98.5	52
39	118.9	96.3	119.7	96.9	120.5	97.5	121.2	98.2	122.0	98.8	122.8	99.4	123.6	100.1	124.3	100.7	51
40	117.2	98.3	118.0	99.0	118.7	99.6	119.5	100.3	120.3	100.9	121.0	101.6	121.8	102.2	122.6	102.8	50
41	115.5	100.4	116.2	101.0	117.0	101.7	117.7	102.3	118.5	103.0	119.2	103.7	120.0	104.3	120.8	105.0	49
42	113.7	102.4	114.4	103.0	115.2	103.7	115.9	104.4	116.7	105.1	117.4	105.7	118.2	106.4	118.9	107.1	48
43	111.9	104.3	112.6	105.0	113.4	105.7	114.1	106.4	114.8	107.1	115.6	107.8	116.3	108.4	117.0	109.1	47
44	110.1	106.3	110.8	107.0	111.5	107.7	112.2	108.4	112.9	109.1	113.7	109.8	114.4	110.5	115.1	111.1	46
45	108.2	108.2	108.9	108.9	109.6	109.6	110.3	110.3	111.0	111.0	111.7	111.7	112.4	112.4	113.1	113.1	45
Cnse.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Cnse.

Traverse Table.

Distance.	161		162		163		164		165		166		167		168		
Cmss.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Cmss.
Pts.																	Pts.
¼	160.8	07.9	161.8	08.0	162.8	08.0	163.8	08.1	164.8	08.1	165.8	08.2	166.8	08.2	167.8	08.2	7¾
½	160.2	15.8	161.2	15.9	162.2	16.0	163.2	16.1	164.2	16.2	165.2	16.3	166.2	16.4	167.2	16.5	½
¾	159.3	23.6	160.2	23.8	161.2	23.9	162.2	24.1	163.2	24.2	164.2	24.4	165.2	24.5	166.2	24.6	¼
1	157.9	31.4	158.9	31.6	159.9	31.8	160.8	32.0	161.8	32.2	162.8	32.4	163.8	32.6	164.8	32.8	•
¼	156.2	39.1	157.1	39.4	158.1	39.6	159.1	39.9	160.1	40.1	161.0	40.3	162.0	40.6	163.0	40.8	¾
½	154.1	46.7	155.0	47.0	156.0	47.3	156.9	47.6	157.9	47.9	158.9	48.2	159.8	48.5	160.8	48.8	½
¾	151.6	54.2	152.5	54.6	153.5	54.9	154.4	55.2	155.3	55.6	156.3	55.9	157.2	56.3	158.2	56.6	¼
2	148.7	61.6	149.7	62.0	150.6	62.4	151.5	62.8	152.4	63.1	153.4	63.5	154.3	63.9	155.2	64.3	6
¼	145.5	68.8	146.4	69.3	147.3	69.7	148.3	70.1	149.2	70.6	150.1	71.0	151.0	71.4	151.9	71.8	¾
½	142.0	75.9	142.9	76.4	143.8	76.8	144.6	77.3	145.5	77.8	146.4	78.2	147.3	78.7	148.2	79.2	½
¾	138.1	82.8	138.9	83.3	139.8	83.8	140.7	84.3	141.5	84.8	142.4	85.3	143.2	85.8	144.1	86.4	¼
3	133.9	89.4	134.7	90.0	135.5	90.6	136.4	91.1	137.2	91.7	138.0	92.2	138.9	92.8	139.7	93.3	5
¼	129.3	95.9	130.1	96.5	130.9	97.1	131.7	97.7	132.5	98.3	133.3	98.9	134.1	99.5	134.9	100.1	¾
½	124.4	102.1	125.2	102.8	126.0	103.4	126.8	104.0	127.5	104.7	128.3	105.3	129.1	105.9	129.9	106.6	½
¾	119.3	108.1	120.0	108.8	120.8	109.5	121.5	110.1	122.3	110.8	123.0	111.5	123.7	112.1	124.5	112.8	¼
4	113.8	113.8	114.5	114.5	115.3	115.3	116.0	116.0	116.7	116.7	117.4	117.4	118.1	118.1	118.8	118.8	4
1°	161.0	02.8	162.0	02.8	163.0	02.8	164.0	02.9	165.0	02.9	166.0	02.9	167.0	02.9	168.0	02.9	89°
2	160.9	05.6	161.9	05.7	162.9	05.7	163.9	05.7	164.9	05.8	165.9	05.8	166.9	05.8	167.9	05.9	88
3	160.8	08.4	161.8	08.5	162.8	08.5	163.8	08.6	164.8	08.6	165.8	08.7	166.8	08.7	167.8	08.8	87
4	160.6	11.2	161.6	11.3	162.6	11.4	163.6	11.4	164.6	11.5	165.6	11.6	166.6	11.6	167.6	11.7	86
5	160.4	14.0	161.4	14.1	162.4	14.2	163.4	14.3	164.4	14.4	165.4	14.5	166.4	14.6	167.4	14.6	85
6	160.1	16.8	161.1	16.9	162.1	17.0	163.1	17.1	164.1	17.2	165.1	17.4	166.1	17.5	167.1	17.6	84
7	159.8	19.6	160.8	19.7	161.8	19.9	162.8	20.0	163.8	20.1	164.8	20.2	165.8	20.4	166.7	20 5	83
8	159.4	22.4	160.4	22.5	161.4	22.7	162.4	22.8	163.4	23.0	164.4	23.1	165.4	23.2	166.4	23.4	82
9	159.0	25.2	160.0	25.3	161.0	25.5	162.0	25.7	163.0	25.8	164.0	26.0	164.9	26.1	165.9	26.3	81
10	158.6	28.0	159.5	28.1	160.5	28.3	161.5	28.5	162.5	28.7	163.5	28.8	164.5	29.0	165.4	29.2	80
11	158.0	30.7	159.0	30.9	160.0	31.1	161.0	31.3	162.0	31.5	163.0	31.7	163.9	31.9	164.9	32.1	79
12	157.5	33.5	158.5	33.7	159.4	33.9	160.4	34.1	161.4	34.3	162.4	34.5	163.4	34.7	164.3	34.9	78
13	156.9	36.2	157.8	36.4	158.8	36.7	159.8	36.9	160.8	37.1	161.7	37.3	162.7	37.6	163.7	37.8	77
14	156.2	38.9	157.2	39.2	158.2	39.4	159.1	39.7	160.1	39.9	161.1	40.2	162.0	40.4	163.0	40.6	76
15	155.5	41.7	156.5	41.9	157.4	42.2	158.4	42.4	159.4	42.7	160.3	43.0	161.3	43.2	162.3	43.5	75
16	154.8	44.4	155.7	44.7	156.7	44.9	157.6	45.2	158.6	45.5	159.6	45.8	160.5	46.0	161.5	46.3	74
17	154.0	47.1	154.9	47.4	155.9	47.7	156.8	47.9	157.8	48.2	158.7	48.5	159.7	48.8	160.7	49.1	73
18	153.1	49.8	154.1	50.1	155.0	50.4	156.0	50.7	156.9	51.0	157.9	51.3	158.8	51.6	159.8	51.9	72
19	152.2	52.4	153.2	52.7	154.1	53.1	155.1	53.4	156.0	53.7	157.0	54.0	157.9	54.4	158.8	54.7	71
20	151.3	55.1	152.2	55.4	153.2	55.7	154.1	56.1	155.0	56.4	156.0	56.8	156.9	57.1	157.9	57.5	70
21	150.3	57.7	151.2	58.1	152.2	58.4	153.1	58.8	154.0	59.1	155.0	59.5	155.9	59.8	156.8	60.2	69
22	149.3	60.3	150.2	60.7	151.1	61.1	152.1	61.4	153.0	61.8	153.9	62.2	154.8	62.6	155.8	62.9	68
23	148.2	62.9	149.1	63.3	150.0	63.7	151.0	64.1	151.9	64.5	152.8	64.9	153.7	65.3	154.6	65.6	67
24	147.1	65.5	148.0	65.9	148.9	66.3	149.8	66.7	150.7	67.1	151.6	67.5	152.6	67.9	153.5	68.3	66
25	145.9	68.0	146.8	68.5	147.7	68.9	148.6	69.3	149.5	69.7	150.4	70.2	151.4	70.6	152.3	71.0	65
26	144.7	70.6	145.6	71.0	146.5	71.5	147.4	71.9	148.3	72.3	149.2	72.8	150.1	73.2	151.0	73.6	64
27	143.5	73.1	144.3	73.5	145.2	74.0	146.1	74.5	147.0	74.9	147.9	75.4	148.8	75.8	149.7	76.3	63
28	142.2	75.6	143.0	76.1	143.9	76.5	144.8	77.0	145.7	77.5	146.6	77.9	147.5	78.4	148.3	78.9	62
29	140.8	78.1	141.7	78.5	142.6	79.0	143.4	79.5	144.3	80.0	145.2	80.5	146.1	81.0	146.9	81.4	61
30	139.4	80.5	140.3	81.0	141.2	81.5	142.0	82.0	142.9	82.5	143.8	83.0	144.6	83.5	145.5	84.0	60
31	138.0	82.9	138.9	83.4	139.7	84.0	140.6	84.5	141.4	85.0	142.3	85.5	143.1	86.0	144.0	86.5	59
32	136.5	85.3	137.4	85.8	138.2	86.4	139.1	86.9	139.9	87.4	140.8	88.0	141.6	88.5	142.5	89.0	58
33	135.0	87.7	135.9	88.2	136.7	88.8	137.5	89.3	138.4	89.9	139.2	90.4	140.1	91.0	140.9	91.5	57
34	133.5	90.0	134.3	90.6	135.1	91.1	136.0	91.7	136.8	92.3	137.6	92.8	138.4	93.4	139.3	93.9	56
35	131.9	92.3	132.7	92.9	133.5	93.5	134.3	94.1	135.2	94.6	136.0	95.2	136.8	95.8	137.6	96.4	55
36	130.3	94.6	131.1	95.2	131.9	95.8	132.7	96.4	133.5	97.0	134.3	97.6	135.1	98.2	135.9	98.7	54
37	128.6	96.9	129.4	97.5	130.2	98.1	131.0	98.7	131.8	99.3	132.6	99.9	133.4	100.5	134.2	101.1	53
38	126.9	99.1	127.7	99.7	128.4	100.4	129.2	101.0	130.0	101.6	130.8	102.2	131.6	102.8	132.4	103.4	52
39	125.1	101.3	125.9	101.9	126.7	102.6	127.5	103.2	128.2	103.8	129.0	104.5	129.8	105.1	130.6	105.7	51
40	123.3	103.5	124.1	104.1	124.9	104.8	125.6	105.4	126.4	106.1	127.2	106.7	127.9	107.3	128.7	108.0	50
41	121.5	105.6	122.3	106.3	123.0	106.9	123.8	107.6	124.5	108.2	125.3	108.9	126.0	109.6	126.8	110.2	49
42	119.6	107.7	120.4	108.4	121.1	109.1	121.9	109.7	122.6	110.4	123.4	111.1	124.1	111.7	124.8	112.4	48
43	117.7	109.8	118.5	110.5	119.2	111.2	119.9	111.8	120.7	112.5	121.4	113.2	122.1	113.9	122.9	114.6	47
44	115.8	111.8	116.5	112.5	117.3	113.2	118.0	113.9	118.7	114.6	119.4	115.3	120.1	116.0	120.8	116.7	46
45	113 8	113.8	114.6	114.6	115.3	115.3	116.0	116.0	116.7	116.7	117.4	117.4	118.1	118.1	118.8	118.8	45
Cmss.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Cmss.

Traverse Table.

Distance	169		170		171		172		173		174		175		176		
Course	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Course
Pts.																	Pts.
¼	168.8	08.3	169.8	08.3	170.8	08.4	171.8	08.4	172.8	08.5	173.8	08.5	174.8	08.6	175.8	08.6	73¾
½	168.2	16.6	169.2	16.7	170.2	16.8	171.2	16.9	172.2	17.0	173.2	17.1	174.2	17.2	175.2	17.3	½
¾	167.2	24.8	168.2	24.9	169.1	25.1	170.1	25.2	171.1	25.4	172.1	25.5	173.1	25.7	174.1	25.8	¼
1	165.7	33.0	166.7	33.2	167.7	33.4	168.7	33.6	169.7	33.8	170.7	34.0	171.6	34.1	172.6	34.3	7
¼	163.9	41.1	164.9	41.3	165.9	41.6	166.8	41.8	167.8	42.0	168.8	42.3	169.8	42.5	170.7	42.8	¾
½	161.7	49.1	162.7	49.3	163.6	49.6	164.6	49.9	165.6	50.2	166.5	50.5	167.5	50.8	168.4	51.1	½
¾	159.1	56.9	160.1	57.3	161.0	57.6	161.9	57.9	162.9	58.3	163.8	58.6	164.8	59.0	165.7	59.3	¼
2	156.1	64.7	157.1	65.1	158.0	65.4	158.9	65.8	159.8	66.2	160.8	66.6	161.7	67.0	162.6	67.4	6
¼	152.8	72.3	153.7	72.7	154.6	73.1	155.5	73.6	156.4	74.0	157.3	74.4	158.2	74.8	159.1	75.3	¾
½	149.0	79.7	149.9	80.1	150.8	80.6	151.7	81.1	152.6	81.5	153.5	82.0	154.3	82.5	155.2	83.0	½
¾	145.0	86.9	145.8	87.4	146.7	87.9	147.5	88.4	148.4	88.9	149.2	89.4	150.1	90.0	151.0	90.5	¼
3	140.5	93.9	141.3	94.4	142.2	95.0	143.0	95.6	143.8	96.1	144.7	96.7	145.5	97.2	146 3	97.8	5
¼	135.7	100.7	136.5	101.3	137.3	101.9	138.1	102.5	138.9	103.1	139.8	103.7	140.6	104.2	141.4	104.8	¾
½	130.6	107.2	131.4	107.8	132.2	108.5	133.0	109.1	133.7	109.7	134.5	110.4	135.3	111.0	136.0	111.6	½
¾	125.2	113.5	126.0	114.2	126.7	114.8	127.4	115.5	128.2	116.2	128.9	116.8	129.7	117.5	130.4	118.2	¼
4	119.5	119.5	120.2	120.2	120.9	120.9	121.6	121·6	122.3	122.3	123.0	123.0	123.7	123.7	124.4	124.4	4
1°	169.0	02.9	170.0	03.0	171.0	03.0	172.0	03.0	173.0	03.0	174.0	03.0	175.0	03.1	176.0	03.1	89°
2	168.9	05.9	169.9	05.9	170.9	06.0	171.9	06.0	172.9	06.0	173.9	06.1	174.9	06.1	175.9	06.1	88
3	168.8	08.8	169.8	08.9	170.8	08.9	171.8	09.0	172.8	09.1	173.8	09.1	174.8	09.2	175.8	09.2	87
4	168.6	11.8	169.6	11.9	170.6	11.9	171.6	12.0	172.6	12.1	173.6	12.1	174.6	12.2	175.6	12.3	86
5	168.4	14.7	169.4	14.8	170.3	14.9	171.3	15.0	172.3	15.1	173.3	15.2	174.3	15 3	175.3	15.3	85
6	168.1	17.7	169.1	17.8	170.1	17.9	171.1	18.0	172.1	18.1	173.0	18.2	174.0	18.3	175.0	18.4	84
7	167.7	20.6	168.7	20.7	169.7	20.8	170.7	21.0	171.7	21.1	172.7	21.2	173.7	21.3	174.7	21.4	83
8	167.4	23.5	168.3	23.7	169.3	23.8	170.3	23.9	171.3	24.1	172.3	24.2	173.3	24.4	174.3	24.5	82
9	166.9	26.4	167.9	26.6	168.9	26.8	169.9	26.9	170.9	27.1	171.9	27.2	172.8	27.4	173.8	27.5	81
10	166.4	29.3	167.4	29.5	168.4	29.7	169.4	29.9	170.4	30.0	171.4	30.2	172.3	30.4	173 3	30.6	80
11	165.9	32.2	166.9	32.4	167.9	32.6	168.8	32.8	169.8	33.0	170.8	33.2	171.8	33.4	172.8	33.6	79
12	165.3	35.1	166.3	35.3	167.3	35.6	168.2	35.8	169.2	36.0	170.2	36.2	171.2	36.4	172.2	36.6	78
13	164.7	38.0	165.6	38.2	166.6	38.5	167.6	38.7	168.6	38.9	169.5	39.1	170.5	39.4	171.5	39.6	77
14	164.0	40.9	165.0	41.1	165.9	41.4	166.9	41.6	167.9	41.9	168.8	42.1	169.8	42.3	170.8	42.6	76
15	163.2	43.7	164.2	44.0	165.2	44.3	166.1	44.5	167.1	44.8	168.1	45.0	169.0	45.3	170.0	45.6	75
16	162.5	46.6	163.4	46.9	164.4	47.1	165.3	47.4	166.3	47.7	167.3	48.0	168.2	48.2	169.2	48.5	74
17	161.6	49.4	162.6	49.7	163.5	50.0	164.5	50.3	165.4	50.6	166.4	50.9	167.4	51.2	168.3	51.5	73
18	160.7	52.2	161.7	52.5	162.6	52.8	163.6	53.2	164.5	53.5	165.5	53.8	166.4	54.1	167.4	54.4	72
19	159.8	55.0	160.7	55.3	161.7	55.7	162.6	56.0	163.6	56.3	164.5	56 6	165.5	57.0	166.4	57.3	71
20	158.8	57.8	159.7	58.1	160.7	58.5	161.6	58.8	162.6	59.2	163.5	59.5	164.4	59.9	165.4	60.2	70
21	157.8	60.6	158.7	60.9	159.6	61.3	160.6	61.6	161.5	62.0	162.4	62.4	163.4	62.7	164.3	63.1	69
22	156.7	63.3	157.6	63.7	158.5	64.1	159.5	64.4	160.4	64.8	161.3	65.2	162.3	65.6	163.2	65.9	68
23	155.6	66.0	156.5	66.4	157.4	66.8	158.3	67.2	159.2	67.6	160.2	68.0	161.1	68.4	162.0	68.8	67
24	154.4	68.7	155.3	69.1	156.2	69.6	157.1	70.0	158.0	70.4	159.0	70.8	159.9	71.2	160.8	71.6	66
25	153.2	71.4	154.1	71.8	155.0	72.3	155.9	72.7	156.8	73.1	157.7	73.5	158.6	74.0	159.5	74.4	65
26	151.9	74.1	152.8	74.5	153.7	75.0	154.6	75.4	155.5	75.8	156.4	76.3	157.3	76.7	158.2	77.2	64
27	150.6	76.7	151.5	77.2	152.4	77.6	153.3	78.1	154.1	78.5	155.0	79.0	155.9	79.4	156.8	79.9	63
28	149·2	79.3	150.1	79.8	151.0	80.3	151.9	80.7	152.7	81.2	153.6	81.7	154.5	82.2	155.4	82.6	62
29	147.8	81.9	148.7	82.4	149.6	82.9	150.4	83.4	151.3	83.9	152.2	84.4	153·1	84.8	153.9	85.3	61
30	146.4	84.5	147.2	85.0	148.1	85.5	149.0	86.0	149.8	86.5	150.7	87.0	151.6	87.5	152.4	88.0	60
31	144.9	87.0	145.7	87.6	146.6	88.1	147.4	88.6	148.3	89.1	149.1	89.6	150.0	90.1	150.9	90.6	59
32	143.3	89·6	144.2	90.1	145.0	90.6	145.9	91.1	146.7	91.7	147.6	92.2	148.4	92.7	149.3	93.3	58
33	141.7	92.0	142.6	92.6	143.4	93.1	144.3	93.7	145.1	94.2	145.9	94.8	146.8	95.3	147.6	95.9	57
34	140.1	94.5	140.9	95.1	141.8	95.6	142.6	96.2	143.4	96.7	144.3	97.3	145.1	97.9	145.9	98.4	56
35	138.4	96.9	139.3	97.5	140.1	98.1	140.9	98.7	141.7	99.2	142.5	99.8	143.4	100.4	144.2	100.9	55
36	136.7	99.3	137.5	99.9	138.3	100.5	139.2	101.1	140.0	101.7	140.8	102.3	141.6	102.9	142.4	103.5	54
37	135.0	101.7	135.8	102.3	136.6	102.9	137.4	103.5	138.2	104.1	139.0	104.7	139.8	105.3	140.6	105.9	53
38	133.2	104.0	134.0	104.7	134.7	105.3	135.5	105.9	136.3	106.5	137.1	107.1	137.9	107.7	138.7	108.4	52
39	131.3	106.4	132.1	107.0	132.9	10°.6	133.7	108.2	134.4	108.9	135.2	109.5	136.0	110.1	136.8	110.8	51
40	129.5	108.6	130.2	109.3	131.0	109.9	131.8	110.6	132.5	111.2	133.3	111.8	134.1	112.5	134.8	113.1	50
41	127.5	110.9	128.3	111.5	129.1	112.2	129.8	112.8	130.6	113.5	131.3	114.2	132.1	114.8	132.8	115.5	49
42	125.6	113.1	126.3	113.8	127.1	114.4	127.8	115.1	128.6	115.8	129.3	116.4	130.1	117.1	130.8	117.8	48
43	123.6	115.3	124.3	115.9	125.1	116.6	125.8	117.3	126.5	118.0	127.3	118.7	128.0	119.3	128.7	120.0	47
44	121.6	117.4	122.3	118.1	123.0	118.8	123.7	119.5	124.4	120.2	125.2	120.9	125.9	121.6	126.6	122.3	46
45	119.5	119.5	120.2	120.2	120.9	120.9	121 6	121.6	122.3	122.3	123.0	123.0	123.7	123.7	124.5	124.5	45
Course	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Course

Traverse Table.

Distance	177		178		179		180		181		182		183		184		
Course	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Course
Pts.																	Pts.
¼	176.8	08.7	177.8	08.7	178.8	08.8	179.8	08.8	180.8	08.9	181.8	08.9	182.8	09.0	183.8	09.0	7¾
½	176.1	17.4	177.1	17.4	178.1	17.5	179.1	17.6	180.1	17.7	181.1	17.8	182.1	17.9	183.1	18.0	½
¾	175.1	26 0	176.1	26.1	177.1	26.3	178.0	26.4	179.0	26.6	180.0	26.7	181.0	26.8	182.0	27.0	¼
1	173.6	34.5	174.6	34.7	175.6	34.9	176.5	35.1	177.5	35.3	178.5	35.5	179.5	35.7	180.5	35.9	7
¼	171.7	43.0	172.7	43.3	173.6	43.5	174.6	43.7	175.6	44.0	176.5	44.2	177.5	44.5	178.5	44.7	¾
½	169.4	51.4	170.3	51.7	171.3	52.0	172.3	52.2	173.2	52.5	174.2	52.8	175.1	53.1	176.1	53.4	½
¾	166.6	59.6	167.6	60.0	168.5	60.3	169.5	60.6	170.4	61.0	171.4	61.3	172.3	61.6	173.2	62.0	¼
2	163.5	67.7	164.5	68.1	165.4	68.5	166.3	68.9	167.2	69.3	168.2	69.7	169.1	70.0	170.0	70.4	6
¼	160.0	75.7	160.9	76.1	161.8	76.5	162.7	77.0	163.6	77.4	164.5	77.8	165.4	78.3	166.3	78.7	¾
½	156.1	83.4	157.0	83.9	157.9	84.4	158.8	84.8	159.6	85.3	160.5	85.8	161.4	86.3	162.3	86.7	½
¾	151.8	91.0	152.7	91.5	153.5	92.0	154.4	92.5	155.3	93.0	156.1	93.6	157.0	94.1	157.8	94.6	¼
3	147.2	98.3	148.0	98.9	148.8	99.4	149.7	100.0	150.5	100.6	151.3	101.1	152.2	101.7	153.0	102.2	5
¼	142.2	105.4	143.0	106.0	143.8	106.6	144.6	107.2	145.4	107.8	146.2	108.4	147.0	109.0	147.8	109.6	¾
½	136.8	112.3	137.6	112.9	138.4	113.6	139.1	114.2	139.9	114.8	140.7	115.5	141.5	116.1	142.2	116.7	½
¾	131.1	118.9	131.9	119.5	132.6	120.2	133.4	120.9	134.1	121.5	134.8	122.2	135.6	122.9	136.3	123.6	¼
4	125.2	125.2	125.9	125.9	126.6	126.6	127.3	127.3	128.0	128.0	128.7	128.7	129.4	129.4	130.1	130.1	4
1°	177.0	03.1	178.0	03.1	179.0	03.1	180.0	03.1	181.0	03.2	182.0	03.2	183.0	03.2	184.0	03.2	89°
2	176.9	06.2	177.9	06.2	178.9	06.2	179.9	06.3	180.9	06.3	181.9	06.4	182.9	06.4	183.9	06.4	88
3	176.8	09.3	177.8	09.3	178.8	09.4	179.8	09.4	180.8	09.5	181.8	09.5	182.7	09.6	183.7	09.6	87
4	176.6	12.3	177.6	12.4	178.6	12.5	179.6	12.6	180.6	12.6	181.6	12.7	182.6	12.8	183.6	12.8	86
5	176.3	15.4	177.3	15.5	178.3	15.6	179.3	15.7	180.3	15.8	181.3	15.9	182.3	15.9	183.3	16.0	85
6	176.0	18.5	177.0	18.6	178.0	18.7	179.0	18.8	180.0	18.9	181.0	19.0	182.0	19.1	183.0	19.2	84
7	175.7	21.6	176.7	21.7	177.7	21.8	178.7	21.9	179.7	22.1	180.6	22.2	181.6	22.3	182.6	22.4	83
8	175.3	24.6	176.3	24.8	177.3	24.9	178.2	25.1	179.2	25.2	180.2	25.3	181.2	25.5	182.2	25.6	82
9	174.8	27.7	175.8	27.8	176.8	28.0	177.8	28.2	178.8	28.3	179.8	28.5	180.7	28.6	181.7	28.8	81
10	174.3	30.7	175.3	30.9	176.3	31.1	177.3	31.3	178.3	31.4	179.2	31.6	180.2	31.8	181.2	32.0	80
11	173.7	33.8	174.7	34.0	175.7	34.2	176.7	34.3	177.7	34.5	178.7	34.7	179.6	34.9	180.6	35.1	79
12	173.1	36.8	174.1	37.0	175.1	37.2	176.1	37.4	177.0	37.6	178.0	37.8	179.0	38.0	180.0	38.3	78
13	172.5	39.8	173.4	40.0	174.4	40.3	175.4	40.5	176.4	40.7	177.3	40.9	178.3	41.2	179.3	41.4	77
14	171.7	42.8	172.7	43.1	173.7	43.3	174.7	43.5	175.6	43.8	176.6	44.0	177.6	44.3	178.5	44.5	76
15	171.0	45.8	171.9	46.1	172.9	46.3	173.9	46.6	174.8	46.8	175.8	47.1	176.8	47.4	177.7	47.6	75
16	170.1	48.8	171.1	49.1	172.1	49.3	173.0	49.6	174.0	49.9	174.9	50.2	175.9	50.4	176.9	50.7	74
17	169.3	51.7	170.2	52.0	171.2	52.3	172.1	52.6	173.1	52.9	174.0	53.2	175.0	53.5	176.0	53.8	73
18	168.3	54.7	169.3	55.0	170.2	55.3	171.2	55.6	172.1	55.9	173.1	56.2	174.0	56.6	175.0	56.9	72
19	167.4	57.6	168.3	58.0	169.2	58.3	170.2	58.6	171.1	58.9	172.1	59.3	173.0	59.6	174.0	59.9	71
20	166.3	60.5	167.3	60.9	168.2	61.2	169.1	61.6	170.1	61.9	171.0	62.2	172.0	62.6	172.9	62.9	70
21	165.2	63.4	166.2	63.8	167.1	64.1	168 0	64.5	169.0	64.9	169.9	65.2	170.8	65.6	171.8	65.9	69
22	164.1	66.3	165.0	66.7	166.0	67.1	166.9	67.4	167.8	67.8	168.7	68.2	169.7	68.6	170.6	68.9	68
23	162.9	69.2	163.8	69.6	164.8	69.9	165.7	70.3	166.6	70.7	167.5	71.1	168.5	71.5	169.4	71.9	67
24	161.7	72.0	162.6	72.4	163.5	72.8	164.4	73.2	165.4	73.6	166.3	74.0	167.2	74.4	168.1	74.8	66
25	160.4	74.8	161.3	75.2	162.2	75.6	163.1	76.1	164.0	76.5	164.9	76.9	165.9	77.3	166.8	77.8	65
26	159.1	77.6	160.0	78.0	160.9	78.5	161.8	78.9	162.7	79.3	163.6	79.8	164.5	80.2	165.4	80.7	64
27	157.7	80.4	158.6	80.8	159.5	81.3	160.4	81.7	161.3	82.2	162.2	82.6	163.1	83.1	163.9	83.5	63
28	156.3	83.1	157.2	83.6	158.0	84.0	158.9	84.5	159.8	85.0	160.7	85.4	161.6	85.9	162.5	86.4	62
29	154.8	85.8	155.7	86.3	156.6	86.8	157.4	87.3	158.3	87.8	159.2	88.2	160.1	88.7	160.9	89.2	61
30	153.3	88.5	154.2	89.0	155.0	89.5	155.9	90.0	156.8	90.5	157.6	91.0	158.5	91.5	159.3	92.0	60
31	151.7	91.2	152.6	91.7	153.4	92.2	154.3	92.7	155.1	93.2	156.0	93.7	156.9	94.3	157.7	94.8	59
32	150.1	93.8	151.0	94.3	151.8	94.9	152.6	95.4	153.5	95.9	154.3	96.4	155.2	97.0	156.0	97.5	58
33	148.4	96.4	149.3	96.9	150.1	97.5	151.0	98.0	151.8	98.6	152.6	99.1	153.5	99.7	154.3	100.2	57
34	146.7	99.0	147.6	99.5	148.4	100.1	149.2	100.7	150.1	101.2	150.9	101.8	151.7	102.3	152.5	102.9	56
35	145.0	101.5	145.8	102.1	146.6	102.7	147.4	103.2	148.3	103.8	149.1	104.4	149.9	105.0	150.7	105.5	55
36	143.2	104.0	144.0	104.6	144.8	105.2	145.6	105.8	146.4	106.4	147.2	107.0	148.1	107.6	148.9	108.2	54
37	141.4	106.5	142.2	107.1	143.0	107.7	143.8	108.3	144.6	108.9	145.4	109.5	146.2	110.1	146.9	110.7	53
38	139.5	109.0	140.3	109.6	141.1	110.2	141.8	110.8	142.6	111.4	143.4	112.1	144.2	112.7	145.0	113.3	52
39	137.6	111.4	138.3	112.0	139.1	112.6	139.9	113.3	140.7	113.9	141.4	114.5	142.2	115.2	143.0	115.8	51
40	135.6	113.8	136.4	114.4	137.1	115.1	137.9	115.7	138.7	116.3	139.4	117.0	140.2	117.6	141.0	118.3	50
41	133.6	116.1	134.3	116.8	135.1	117.4	135.8	118.1	136.6	118.7	137.4	119.4	138.1	120.1	138.9	120.7	49
42	131.5	118.4	132.3	119.1	133.0	119.8	133.8	120.4	134.5	121.1	135.3	121.8	136.0	122.5	136.7	123.1	48
43	129.4	120.7	130.2	121.4	130.9	122.1	131.6	122.8	132.4	123.4	133.1	124.1	133.8	124.8	134.6	125.5	47
44	127.3	123.0	128.0	123.6	128.8	124.3	129.5	125.0	130.2	125.7	130.9	126.4	131.6	127.1	132.4	127.8	46
45	125.2	125.2	125.9	125.9	126.6	126.6	127.3	127.3	128 0	128.0	128.7	128.7	129.4	129.4	130.1	130.1	45
Course	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat	Dep.	Diff Lat.	Course

Traverse Table.

Distance	185		186		187		188		189		190		191		192		
Course	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Course
Pts																	Pts
¼	184.8	09.1	185.8	09.1	186.8	09.2	187.8	09.2	188.8	09.3	189.8	09.3	190.8	09.4	191.8	09.4	7¼
½	184.1	18.1	185.1	18.2	186.1	18.3	187.1	18.4	188.1	18.5	189.1	18.6	190.1	18.7	191.1	18 8	½
¾	183.0	27.1	184.0	27.3	185.0	27.4	186.0	27.6	186.9	27.7	187.9	27.9	188.9	28.0	189.9	28.2	¾
1	181.4	36.1	182.4	36.3	183.4	36.5	184.4	36.7	185.4	36.9	186.3	37.1	187.3	37.3	188.3	37.5	7
¼	179.5	45.0	180.4	45.2	181.4	45.4	182.4	45.7	183.3	45.9	184.3	46.2	185.3	46.4	186.2	46.7	¼
½	177.0	53.7	178.0	54.0	179.0	54.3	179.9	54.6	180.9	54.9	181.8	55.1	182.8	55.4	183.7	55.7	½
¾	174.2	62.3	175.1	62.7	176.1	63.0	177.0	63.3	177.9	63.7	178.9	64.0	179.8	64.3	180.8	64.7	¾
2	170.9	70.8	171.8	71.2	172.8	71.6	173.7	71.9	174.6	72.3	175.5	72.7	176.5	73.1	177.4	73.5	6
¼	167.2	79.1	168.1	79.5	169.0	80.0	169.9	80.4	170.9	80.8	171.8	81.2	172.7	81.7	173.6	82.1	¼
½	163.2	87.2	164.0	87.7	164.9	88.1	165.8	88.6	166.7	89.1	167.6	89.6	168.5	90.0	169.3	90.5	½
¾	158.7	95.1	159.5	95.6	160.4	96.1	161.2	96.6	162.1	97.2	163.0	97.7	163.8	98.2	164.7	98.7	¾
3	153.8	102.8	154.6	103.3	155.5	103.9	156.3	104.4	157.1	105.0	158.0	105.6	158.8	106.1	159.6	106.7	5
¼	148.6	110.2	149.4	110.8	150.2	111.4	151.0	112.0	151.8	112.6	152.6	113.2	153.4	113.8	154.2	114.4	¼
½	143.0	117.4	143.8	118.0	144.5	118.6	145.3	119.3	146.1	119.9	146.9	120.5	147.6	121.2	148.4	121.8	½
¾	137.1	124.2	137.8	124.9	138 6	125.6	139.3	126.2	140.0	126.9	140.8	127.6	141.5	128.3	142.3	128.9	¾
4	130.8	130.8	131.5	131.5	132.2	132.2	132.9	132.9	133.6	133.6	134.3	134.3	135.1	135.1	135.8	135.8	4
1°	185.0	03.2	186.0	03.2	187.0	03.3	188.0	03.3	189.0	03.3	190.0	03.3	191.0	03.3	192.0	03.4	89°
2	184.9	06.5	185.9	06.5	186.9	06.5	187.9	06.6	188.9	06.6	189.9	06.6	190.9	06.7	191.9	06 7	88
3	184.7	09.7	185.7	09.7	186.7	09.8	187.7	09.8	188.7	09.9	189.7	09.9	190.7	10.0	191.7	10.0	87
4	184.5	12.9	185.5	13.0	186.5	13.0	187.5	13.1	188.5	13.2	189.5	13.3	190.5	13.3	191.5	13.4	86
5	184.3	16.1	185.3	16.2	186.3	16.3	187.3	16.4	188.3	16.5	189.3	16.6	190.3	16.6	191.3	16.7	85
6	184.0	19.3	185.0	19.4	186.0	19.5	187.0	19.7	188.0	19.8	189.0	19.9	190.0	20.0	190.9	20.1	84
7	183.6	22.5	184.6	22.7	185.6	22.8	186.6	22.9	187.6	23.0	188.6	23.2	189.6	23.3	190 6	23.4	83
8	183.2	25.7	184.2	25.9	185.2	26.0	186.2	26.2	187.2	26.3	188.2	26.4	189.1	26.6	190.1	26.7	82
9	182.7	28.9	183.7	29.1	184.7	29.3	185.7	29.4	186.7	29.6	187.7	29.7	188 6	29.9	189 6	30.0	81
10	182.2	32.1	183.2	32.3	184.2	32.5	185.1	32.6	186.1	32.8	187.1	33.0	188.1	33.2	189.1	33.3	80
11	181.6	35.3	182.6	35.5	183.6	35.7	184.5	35.9	185.5	36.1	186.5	36.3	187.5	36.4	188.5	36 6	79
12	181.0	38.5	181.9	38.7	182.9	38.9	183.9	39.1	184.9	39.3	185.8	39.5	186.8	39.7	187.8	39.9	78
13	180.3	41.6	181.2	41.8	182.2	42.1	183.2	42.3	184.2	42.5	185.1	42.7	186.1	43.0	187.1	43.2	77
14	179.5	44.8	180.5	45.0	181.4	45.2	182.4	45.5	183.4	45.7	184.4	46.0	185.3	46.2	186.3	46.4	76
15	178.7	47.9	179.7	48.1	180.6	48.4	181.6	48.7	182.6	48.9	183.5	49.2	184.5	49.4	185.5	49.7	75
16	177.8	51.0	178.8	51.3	179.8	51.5	180.7	51.8	181.7	52.1	182.6	52.4	183.6	52.6	184.6	52.9	74
17	176.9	54.1	177.9	54.4	178.8	54.7	179.8	55.0	180.7	55.3	181.7	55.6	182.7	55.8	183.6	56.1	73
18	175.9	57.2	176.9	57.5	177.8	57.8	178.8	58.1	179.7	58.4	180.7	58.7	181.7	59.0	182.6	59.3	72
19	174.9	60.2	175.9	60.6	176.8	60.9	177.8	61.2	178.7	61.5	179.6	61.9	180.6	62.2	181.5	62.5	71
20	173.8	63.3	174.8	63.6	175.7	64.0	176.7	64.3	177.6	64.6	178.5	65.0	179.5	65.3	180.4	65.7	70
21	172.7	66.3	173.6	66.7	174.6	67.0	175.5	67.4	176.4	67.7	177.4	68.1	178.3	68.4	179.2	68.8	69
22	171.5	69.3	172.5	69.7	173.4	70.1	174.3	70.4	175.2	70.8	176.2	71.2	177.1	71.5	178.0	71.9	68
23	170.3	72.3	171.2	72.7	172.1	73.1	173.1	73.5	174.0	73.8	174.9	74.2	175.8	74.6	176.7	75.0	67
24	169.0	75.2	169.9	75.7	170.8	76.1	171.7	76.5	172.7	76.9	173.6	77.3	174.5	77.7	175.4	78.1	66
25	167.7	78.2	168.6	78.6	169.5	79.0	170.4	79.5	171.3	79.9	172.2	80.3	173.1	80.7	174.0	81.1	65
26	166.3	81.1	167.2	81.5	168.1	82.0	169.0	82.4	169.9	82.9	170.8	83.3	171.7	83.7	172.6	84.2	64
27	164.8	84.0	165.7	84.4	166.6	84.9	167.5	85.4	168.4	85.8	169.3	86.3	170.2	86.7	171.1	87.2	63
28	163.3	86.9	164.2	87.3	165.1	87.8	166.0	88.3	166.9	88.7	167.8	89.2	168.6	89.7	169.5	90.1	62
29	161.8	89.7	162.7	90.2	163.6	90.7	164.4	91.1	165.3	91.6	166.2	92.1	167.1	92.6	167.9	93.1	61
30	160.2	92.5	161.1	93.0	161.9	93.5	162.8	94.0	163.7	94.5	164.5	95.0	165.4	95.5	166.3	96.0	60
31	158.6	95.3	159.4	95.8	160.3	96.3	161.1	96.8	162.0	97.3	162.9	97.9	163.7	98.4	164.6	98.9	59
32	156.9	98.0	157.7	98.6	158.6	99.1	159.4	99.6	160.3	100.2	161.1	100.7	162.0	101.2	162.8	101.7	58
33	155.2	100.8	156.0	101.3	156.8	101.8	157.7	102.4	158.5	102.9	159.3	103.5	160.2	104.0	161.0	104.6	57
34	153.4	103.5	154.2	104.0	155.0	104.6	155.9	105.1	156.7	105.7	157.5	106.2	158.3	106.8	159.2	107.4	56
35	151.5	106.1	152.4	106.7	153.2	107.3	154.0	107.8	154.8	108.4	155.6	109.0	156.5	109.6	157.3	110.1	55
36	149.7	108.7	150.5	109.3	151.3	109.9	152.1	110.5	152.9	111.1	153.7	111.7	154.5	112.3	155.3	112.9	54
37	147.7	111.3	148 5	111.9	149.3	112.5	150.1	113.1	150.9	113.7	151.7	114.3	152.5	114 9	153.3	115.5	53
38	145.8	113.9	146.6	114.5	147.4	115.1	148.1	115.7	148.9	116.4	149.7	117.0	150.5	117.6	151.3	118.2	52
39	143.8	116.4	144.5	117.1	145.3	117.7	146.1	118.3	146.9	118.9	147.7	119.6	148.4	120.2	149.2	120.8	51
40	141.7	118.9	142.5	119.6	143.3	120.2	144.0	120.8	144.8	121.5	145.5	122.1	146.3	122.8	147.1	123.4	50
41	139 6	121.4	140.4	122.0	141.1	122.7	141.9	123.3	142.6	124.0	143.4	124.7	144.1	125.3	144.9	126 0	49
42	137.5	123.8	138.2	124.5	139.0	125.1	139.7	125.8	140.5	126.5	141.2	127.1	141.9	127.8	142.7	128.5	48
43	135.3	126.3	136.0	126.9	136.8	127.5	137.5	128.2	138.2	128.9	139.0	129.6	139.7	130.3	140.4	130.9	47
44	133.1	128.5	133.8	129.2	134.5	129.9	135.2	130.6	136.0	131.3	136.7	132.0	137.4	132.7	138.1	133.4	46
45	130 8	130.8	131.5	131.5	132.2	132.2	132.9	132.9	133.6	133.6	134.4	134.4	135.1	135.1	135.8	135.8	45
Course	Dep.	Diff Lat.	Dep.	Diff Lat.	Dep.	Diff Lat.	Dep.	Diff Lat.	Dep.	Diff Lat.	Dep.	Diff Lat.	Dep.	Diff Lat.	Dep.	Diff Lat.	Course

Traverse Table.

Distance.	193		194		195		196		197		198		199		200		
Cmse.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Cmse.
Pts.																	Pts.
¼	192.8	09.5	193.8	09.5	194.8	09.6	195.8	09.6	196.8	09 7	197.8	09.7	198.8	09.8	199.8	09.8	¼
½	192.1	18.9	193.1	19.0	194.1	19.1	195.1	19.2	196.1	19.3	197.0	19.4	198.0	19.5	199.0	19.6	½
¾	190.9	28.3	191.9	28.5	192.9	28.6	193.9	28.8	194.9	28.9	195.9	29.0	196.8	29.2	197.8	29.3	¾
1	189.3	37.7	190.3	37.8	191.2	38.0	192.2	38.2	193.2	38.4	194.2	38.6	195.2	38.8	196.2	39.0	7
¼	187.2	46.9	188.2	47.1	189.2	47.4	190.1	47.6	191.1	47.9	192.1	48.1	193.0	48.4	194.0	48.6	¼
½	184.7	56.0	185.7	56.3	186.6	56.6	187.6	56.9	188.5	57.2	189.5	57.5	190.4	57.8	191.4	58.1	½
¾	181.7	65.0	182.7	65.4	183.6	65.7	184.5	66.0	185.5	66.4	186.4	66.7	187.4	67.0	188.3	67.4	¾
2	178.3	73.9	179.2	74.2	180.2	74.6	181.1	75.0	182.0	75.4	182.9	75.8	183.9	76.2	184.8	76.5	6
¼	174.5	82.5	175.4	83.0	176.3	83.4	177.2	83.8	178.1	84.2	179.0	84.7	179.9	85.1	180.8	85.5	¼
½	170.2	91.0	171.1	91.4	172.0	91.9	172.9	92.4	173.7	92.9	174.6	93.3	175.5	93.8	176.4	94.3	½
¾	165.5	99.2	166.4	99.7	167.3	100.2	168.1	100.8	169.0	101.3	169.8	101.8	170.7	102.3	171.5	102.8	¾
3	160.5	107.2	161.3	107.8	162.1	108.3	163.0	108.9	163.8	109.4	164.6	110.0	165.5	110.6	166.3	111.1	5
¼	155.0	115.0	155.8	115.6	156.6	116.2	157.4	116.8	158.2	117.4	159.0	118.0	159.8	118.5	160.6	119.1	¼
½	149.2	122.4	150.0	123.1	150.7	123.7	151.5	124.3	152.3	125.0	153.1	125.6	153.8	126.2	154.6	126.9	½
¾	143.0	129.6	143.7	130.3	144.5	130.9	145.2	131.6	146.0	132.3	146.7	133.0	147.4	133.6	148.2	134.3	¾
4	136.5	136.5	137.2	137.2	137.9	137.9	138.6	138.6	139.3	139.3	140.0	140.0	140.7	140.7	141.4	141.4	4
1°	193.0	03.4	194.0	03.4	195.0	03.4	196.0	03.4	197.0	03.4	198.0	03.5	199.0	03.5	200.0	03.5	89°
2	192.9	06.7	193.9	06.8	194.9	06.8	195.9	06.8	196.9	06.9	197.9	06.9	198.9	06.9	199.9	07.0	88
3	192.7	10.1	193.7	10.2	194.7	10.2	195.7	10.3	196.7	10.3	197.7	10.4	198.7	10.4	199.7	10.5	87
4	192.5	13.5	193.5	13.5	194.5	13.6	195.5	13.7	196.5	13.7	197.5	13.8	198.5	13.9	199.5	14.0	86
5	192.3	16.8	193.3	16.9	194.3	17.0	195.3	17.1	196.3	17.2	197.2	17.3	198.2	17.3	199.2	17.4	85
6	191.9	20.2	192.9	20.3	193.9	20.4	194.9	20.5	195.9	20.6	196.9	20.7	197.9	20.8	198.9	20.9	84
7	191.6	23.5	192.6	23.6	193.5	23.8	194.5	23.9	195.5	24.0	196.5	24.1	197.5	24.3	198.5	24.4	83
8	191.1	26.9	192.1	27.0	193.1	27.1	194.1	27.3	195.1	27.4	196.1	27.6	197.1	27.7	198.1	27.8	82
9	190.6	30.2	191.6	30.3	192.6	30.5	193.6	30.7	194.6	30.8	195.6	31.0	196.5	31.1	197.5	31.3	81
10	190.1	33.5	191.1	33.7	192.0	33.9	193.0	34.0	194.0	34.2	195.0	34.4	196.0	34.6	197.0	34.7	80
11	189.5	36.8	190.4	37.0	191.4	37.2	192.4	37.4	193.4	37.6	194.4	37.8	195.3	38.0	196.3	38.2	79
12	188.8	40.1	189.8	40.3	190.7	40.5	191.7	40.8	192.7	41.0	193.7	41.2	194.7	41.4	195.6	41.6	78
13	188.1	43.4	189.0	43.6	190.0	43.9	191.0	44.1	192.0	44.3	192.9	44.5	193.9	44.8	194.9	45.0	77
14	187.3	46.7	188.2	46.9	189.2	47.2	190.2	47.4	191.1	47.7	192.1	47.9	193.1	48.1	194.1	48.4	76
15	186.4	50.0	187.4	50.2	188.4	50.5	189.3	50.7	190.3	51.0	191.3	51.2	192.2	51.5	193.2	51.8	75
16	185.5	53.2	186.5	53.5	187.4	53.7	188.4	54.0	189.4	54.3	190.3	54.6	191.3	54.9	192.3	55.1	74
17	184.6	56.4	185.5	56.7	186.5	57.0	187.4	57.3	188.4	57.6	189.3	57.9	190.3	58.2	191.3	58.5	73
18	183.6	59.6	184.5	59.9	185.5	60.3	186.4	60.6	187.4	60.9	188.3	61.2	189.3	61.5	190.2	61.8	72
19	182.5	62.8	183.4	63.2	184.4	63.5	185.3	63.8	186.3	64.1	187.2	64.5	188.2	64.8	189.1	65.1	71
20	181.4	66.0	182.3	66.4	183.2	66.7	184.2	67.0	185.1	67.4	186.1	67.7	187.0	68.1	187·9	68.4	70
21	180.2	69.2	181.1	69.5	182.0	69.9	183.0	70.2	183.9	70.6	184.8	71.0	185.8	71.3	186.7	71.7	69
22	178.9	72.3	179.9	72.7	180.8	73.0	181.7	73.4	182.7	73.8	183.6	74.2	184.5	74.5	185.4	74.9	68
23	177.7	75.4	178.6	75.8	179.5	76.2	180.4	76.6	181.3	77.0	182.3	77.4	183.2	77.8	184.1	78.1	67
24	176.3	78.5	177.2	78.9	178.1	79.3	179.1	79.7	180.0	80.1	180.9	80.5	181.8	80.9	182.7	81.3	66
25	174.9	81.6	175.8	82.0	176.7	82.4	177.6	82.8	178.5	83.3	179.4	83.7	180.4	84.1	181.3	84.5	65
26	173.5	84.6	174.4	85.0	175.3	85.5	176.2	85.9	177.1	86.4	178.0	86.8	178.9	87.2	179.8	87.7	64
27	172.0	87.6	172.9	88.1	173.7	88.5	174.6	89.0	175.5	89.4	176.4	89.9	177.3	90.3	178.2	90.8	63
28	170.4	90.6	171.3	91.1	172.2	91.5	173.1	92.0	173.9	92.5	174.8	93.0	175.7	93.4	176.6	93.9	62
29	168.8	93.6	169.7	94.1	170.6	94.5	171.4	95.0	172.3	95.5	173.2	96.0	174.0	96.5	174.9	97.0	61
30	167.1	96.5	168.0	97.0	168.9	97.5	169.7	98.0	170.6	98.5	171.5	99.0	172.3	99.5	173.2	100.0	60
31	165.4	99.4	166.3	99.9	167.1	100.4	168.0	100.9	168.9	101.5	169.7	102.0	170.6	102.5	171.4	103.0	59
32	163.7	102.3	164.5	102 8	165.4	103.3	166.2	103.9	167.1	104.4	167.9	104.9	168.8	105.5	169.6	106.0	58
33	161.9	105.1	162.7	105.7	163.5	106.2	164.4	106.7	165.2	107.3	166.1	107.8	166.9	108.4	167.7	108.9	57
34	160.0	107.9	160.8	108.5	161.7	109.0	162.5	109.6	163.3	110.2	164.1	110.7	165.0	111.3	165.8	111.8	56
35	158.1	110.7	158.9	111.3	159.7	111.8	160.6	112.4	161.4	113.0	162.2	113.6	163.0	114.1	163.8	114.7	55
36	156.1	113.4	156.9	114.0	157.8	114.6	158.6	115.2	159.4	115.8	160.2	116.4	161.0	117.0	161.8	117.6	54
37	154.1	116.2	154.9	116.8	155.7	117.4	156.5	118.0	157.3	118.6	158.1	119.2	158.9	119.8	159.7	120.4	53
38	152.1	118.8	152.9	119.4	153.7	120.1	154.5	120.7	155.2	121.3	156.0	121.9	156.8	122.5	157.6	123.1	52
39	150.0	121.5	150.8	122.1	151.5	122.7	152.3	123.3	153.1	124.0	153.9	124.6	154.7	125.2	155.4	125.9	51
40	147.8	124.1	148.6	124.7	149.4	125.3	150.1	126.0	150.9	126.6	151.7	127.3	152.4	127.9	153.2	128.6	50
41	145.7	126.6	146.4	127.3	147.2	127.9	147.9	128.6	148.7	129.2	149.4	129.9	150.2	130.6	150.9	131.2	49
42	143.4	129.1	144.2	129.8	144.9	130.5	145.7	131.1	146.4	131.8	147.1	132.5	147.9	133.2	148.6	133.8	48
43	141.2	131.6	141.9	132.3	142.6	133.0	143.3	133.7	144.1	134.4	144.8	135.0	145.5	135.7	146.3	136.4	47
44	138.8	134.1	139.6	134.8	140.3	135.5	141.0	136.2	141.7	136.8	142.4	137.5	143.1	138.2	143.9	138.9	46
45	136.5	136.5	137.2	137.2	137.9	137.9	138.6	138.6	139.3	139.3	140.0	140.0	140.7	140.7	141.4	141.4	45
Cmse.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Cmse.

Traverse Table.

Distance.	201		202		203		204		205		206		207		208		
Cmn. Pts.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Cmn. Pts.
¼	200.8	09.9	201.8	09.9	202.8	10.0	203.8	10.0	204.8	10.1	205.8	10.1	206.8	10.2	207.8	10.2	¾
½	200.0	19.7	201.0	19.8	202.0	19.9	203.0	20.0	204.0	20.1	205.0	20.2	206.0	20.3	207 0	20.4	½
¾	199.8	29.5	199.8	29.6	200.8	29.8	201.8	29.9	202.8	30.1	203.8	30.2	204.8	30.4	205.7	30.5	¼
1	197.1	39.2	198.1	39.4	199.1	39.6	200.1	39.8	201.1	40.0	202.0	40.2	203.0	40.4	204.0	40.6	7
¼	195.0	48.8	195.9	49.1	196.9	49.3	197.9	49.6	198.9	49.8	199.8	50.1	200.8	50.2	201.8	50.5	¾
½	192.3	58.4	193.3	58.6	194.3	58.9	195.2	59.2	196.2	59.5	197.1	59.8	198.1	60.1	199.0	60.4	½
¾	189.2	67.7	190.2	68.0	191.1	68.4	192.1	68.7	193.0	69.1	194.0	69.4	194.9	69.7	195.8	70.1	¼
2	185.7	76.9	186.6	77.3	187.6	77.7	188.5	78.1	189.4	78.5	190.3	78.8	191.2	79.2	192.2	79.6	6
¼	181.7	85.9	182.6	86.4	183.5	86.8	184.4	87.2	185.3	87.7	186.2	88.1	187.1	88.5	188.0	88.9	¾
½	177.3	94.7	178.2	95.2	179.0	95.7	179.9	96.2	180.8	96.6	181.7	97.1	182.6	97.6	183.4	98.0	½
¾	172.4	103.3	173.3	103.8	174.1	104.4	175.0	104.9	175.8	105.4	176.7	105.9	177.5	106.4	178.4	106.9	¼
3	167.1	111.7	168.0	112.2	168.8	112.8	169.6	113.3	170.4	113.9	171.3	114.4	172.1	115.0	172.9	115.6	5
¼	161.4	119.7	162.2	120.3	163.0	120.9	163.9	121.5	164.7	122.1	165.5	122.7	166.3	123.3	167.1	123.9	¾
½	155.4	127.5	156.1	128 2	156.9	128.8	157.7	129.4	158.5	130.0	159.2	130.7	160.0	131.3	160.8	132.0	½
¾	148.9	135.0	149.7	135.6	150.4	136.3	151.1	137.0	151.9	137.7	152.6	138.3	153.4	139.0	154.1	139.7	¼
4	142.1	142.1	142.8	142.8	143.5	143.5	144 2	144.2	145.0	145.0	145.7	145.7	146.4	146.4	147.1	147.1	4
1°	201.0	03.5	202.0	03.5	203.0	03.5	204.0	03.6	205.0	03.6	206.0	03.6	207.0	03.6	208.0	03.6	89°
2	200.9	07.0	201.9	07.0	202.9	07.1	203.9	07.1	204.9	07.2	205.9	07.2	206.9	07.2	207.9	07.3	88
3	200.7	10.5	201.7	10.6	202.7	10.6	203.7	10.7	204.7	10.7	205.7	10.8	206.7	10.8	207.7	10.9	87
4	200.5	14.0	201.5	14.1	202.5	14.2	203.5	14.2	204.5	14.3	205.5	14.4	206.5	14.4	207.5	14.5	86
5	200.2	17.5	201.2	17.6	202.2	17.7	203.2	17.8	204.2	17.9	205.2	18.0	206.2	18.0	207.2	18.1	85
6	199.9	21.0	200.9	21.1	201.9	21.2	202.9	21.3	203.9	21.4	204.9	21.5	205.9	21.6	206.9	21.7	84
7	199.5	24.5	200.5	24.6	201.5	24.7	202.5	24.9	203.5	25.0	204.5	25.1	205.5	25.2	206.4	25.3	83
8	199.0	28.0	200.0	28.1	201.0	28.3	202.0	28.4	203.0	28.5	204.0	28.7	205.0	28.8	206.0	28.9	82
9	198.5	31.4	199.5	31.6	200.5	31.8	201.5	31.9	202.5	32.1	203.5	32.2	204.5	32.4	205.4	32.5	81
10	197.9	34.9	198.9	35.1	199.9	35.3	200.9	35.4	201.9	35.6	202.9	35.8	203.9	35.9	204.8	36.1	80
11	197.3	38.4	198.3	38.5	199.3	38.7	200.3	38.9	201.2	39.1	202.2	39.3	203.2	39.5	204.2	39.7	79
12	196.6	41.8	197.6	42.0	198.6	42.2	199.5	42.4	200.5	42.6	201.5	42.8	202.5	43.0	203.5	43.2	78
13	195.8	45.2	196.8	45.4	197.8	45.7	198.8	45.9	199.7	46.1	200.7	46.3	201.7	46.6	202.7	46.8	77
14	195.0	48.6	196.0	48.9	197.0	49.1	197.9	49.4	198.9	49.6	199.9	49.8	200.9	50.1	201.8	50.3	76
15	194.2	52.0	195.1	52.3	196.1	52.5	197.0	52.8	198.0	53.1	199.0	53.3	199.9	53.6	200.9	53.8	75
16	193.2	55.4	194.2	55.7	195.1	56.0	196.1	56.2	197.1	56.5	198.0	56.8	199.0	57.1	199.9	57.3	74
17	192.2	58.8	193.2	59.1	194.1	59.4	195.1	59.6	196.0	59.9	197.0	60.2	198.0	60.5	198.9	60.8	73
18	191.2	62.1	192.1	62.4	193.1	62.7	194.0	63.0	195.0	63.3	195.9	63.7	196.9	64.0	197.8	64.3	72
19	190.0	65.4	191.0	65.8	191.9	66.1	192.9	66.4	193.8	66.7	194.8	67.1	195.7	67.4	196.7	67.7	71
20	188.9	68.7	189.8	69.1	190.8	69.4	191.7	69.8	192.6	70.1	193.6	70.5	194.5	70.8	195.5	71.1	70
21	187.6	72.0	188.6	72.4	189.5	72.7	190.5	73.1	191.4	73.5	192.3	73.8	193.3	74.2	194.2	74.5	69
22	186.4	75.3	187.3	75.7	188.2	76.0	189.1	76.4	190.1	76.8	191.0	77.2	191.9	77.5	192.9	77.9	68
23	185.0	78.5	185.9	78.9	186.9	79.3	187.8	79.7	188.7	80.1	189.6	80.5	190.5	80.9	191.5	81.3	67
24	183.6	81.8	184.5	82.2	185.4	82.6	186.4	83.0	187.3	83.4	188.2	83.8	189.1	84.2	190.0	84.6	66
25	182.2	84.9	183.1	85.4	184.0	85.8	184.9	86.2	185.8	86.6	186.7	87.1	187.6	87.5	188.5	87.9	65
26	180.7	88.1	181.6	88.6	182.5	89.0	183.4	89.4	184.3	89.9	185.2	90.3	186.1	90.7	186.9	91.2	64
27	179.1	91.3	180.0	91.7	180.9	92.2	181.8	92.6	182.7	93.1	183.5	93.5	184.4	94.0	185.3	94.4	63
28	177.5	94.4	178.4	94.8	179.2	95.3	180.1	95.8	181.0	96.2	181.9	96.7	182.8	97.2	183.7	97.7	62
29	175.8	97.4	176.7	97.9	177.5	98.4	178.4	98.9	179.3	99.4	180.2	99.9	181.0	100.4	181.9	100.8	61
30	174.1	100.5	174.9	101.0	175.8	101.5	176.7	102.0	177.5	102.5	178.4	103.0	179.3	103.5	180.1	104.0	60
31	172.3	103.5	173.1	104.0	174.0	104.6	174.9	105.1	175.7	105.6	176.6	106.1	177.4	106.6	178.3	107.1	59
32	170.5	106.5	171.3	107.0	172.2	107.6	173.0	108.1	173.8	108.6	174.7	109.2	175.5	109.7	176.4	110.2	58
33	168.6	109.5	169.4	110.0	170.3	110.6	171.1	111.1	171.9	111.7	172.8	112.2	173.6	112.7	174.4	113.3	57
34	166.6	112.4	167.5	113.0	168.3	113.5	169.1	114.1	170.0	114.6	170.8	115.2	171.6	115.8	172.4	116.3	56
35	164.6	115.3	165.5	115.9	166.3	116.4	167.1	117.0	167.9	117.6	168.7	118.2	169.6	118.7	170.4	119.3	55
36	162.6	118.1	163.4	118.7	164.2	119.3	165.0	119.9	165.8	120.5	166.7	121.1	167.5	121.7	168.3	122.3	54
37	160.5	121.0	161.3	121.6	162.1	122.2	162.9	122.8	163.7	123.4	164.5	124.0	165.3	124.6	166.1	125.2	53
38	158.4	123.7	159.2	124.4	160.0	125.0	160.8	125.6	161.5	126.2	162.3	126.8	163.1	127.4	163.9	128.1	52
39	156.2	126.5	157.0	127.1	157.8	127.8	158.5	128.4	159.3	129.0	160.1	129.6	160.9	130.3	161.6	130.9	51
40	154.0	129.2	154.7	129 8	155.5	130.5	156.3	131.1	157.0	131.8	157.8	132.4	158.6	133.1	159.3	133.7	50
41	151.7	131.9	152.5	132.5	153.2	133.2	154.0	133.8	154.7	134.5	155.5	135.1	156.2	135.8	157.0	136.5	49
42	149.4	134.5	150.1	135.2	150.9	135.8	151.6	136.5	152.3	137.2	153.1	137.8	153.8	138.5	154.6	139.2	48
43	147.0	137.1	147.7	137.8	148.5	138.4	149.2	139.1	149.9	139.8	150.7	140.5	151.4	141.2	152.1	141.9	47
44	144.6	139.6	145.3	140.3	146.0	141.0	146.7	141.7	147.5	142.4	148.2	143.1	148.9	143.8	149.6	144.5	46
45	142.1	142.1	142.8	142.8	143.5	143.5	144.2	144.2	145.0	145.0	145.7	145.7	146.4	146.4	147.1	147.1	45
Cmn.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Cmn.

Traverse Table.

Distance.	209		210		211		212		213		214		215		216		
Crse.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Crse.
Pts																	Pts
¼	208.8	10.3	209.8	10.3	210.7	10.4	211.7	10.4	212.7	10.5	213.7	10.5	214.7	10.6	215.7	10.6	7¼
½	208.0	20.5	209.0	20.6	210.0	20.7	211.0	20.8	212.0	20.9	213.0	21.0	214.0	21.1	215.0	21.2	½
¾	206.7	30.7	207.7	30.8	208.7	30.9	209.7	31.1	210.7	31.2	211.7	31.4	212.7	31.5	213.7	31.7	¼
1	205.0	40.8	206.0	41.0	206.9	41.2	207.9	41.4	208.9	41.6	209.9	41.7	210.9	41.9	211.8	42.1	7
¼	202.7	50.8	203.7	51.0	204.7	51.3	205.6	51.5	206.6	51.8	207.6	52.0	208.6	52.2	209.5	52.5	¾
½	200.0	60.7	201.0	61.0	201.9	61.2	202.9	61.5	203.8	61.8	204.8	62.1	205.7	62.4	206.7	62.7	½
¾	196.8	70.4	197.7	70.7	198.7	71.1	199.6	71.4	200.5	71.8	201.5	72.1	202.4	72.4	203.4	72.8	¼
2	193.1	80.0	194.0	80.4	194.9	80.8	195.9	81.1	196.8	81.5	197.7	81.9	198.6	82.3	199.6	82.7	6
¼	188.9	89.4	189.8	89.8	190.7	90.2	191.6	90.6	192.6	91.1	193.5	91.5	194.4	91.9	195.3	92.4	¾
½	184.3	98.5	185.2	99.0	186.1	99.5	187.0	99.9	187.8	100.4	188.7	100.9	189.6	101.3	190.5	101.8	½
¾	179.2	107.4	180.1	108.0	181.0	108.5	181.8	109.0	182.7	109.5	183.5	110.0	184.4	110.5	185.3	111.0	¼
3	173.8	116.1	174.6	116.7	175.4	117.2	176.3	117.8	177.1	118.3	177.9	118.9	178.8	119.4	179.6	120.0	5
¼	167.9	124.5	168.7	125.1	169.5	125.7	170.3	126.3	171.1	126.9	171.9	127.5	172.7	128.1	173.5	128.7	¾
½	161.6	132.6	162.3	133.2	163.1	133.9	163.9	134.5	164.6	135.1	165.4	135.8	166.2	136.4	167.0	137.0	½
¾	154.9	140.3	155.6	141.0	156.3	141.7	157.1	142.4	157.8	143.0	158.6	143.7	159.3	144.4	160.0	145.0	¼
4	147.8	147.8	148.5	148.5	149.2	149.2	149.9	149.9	150.6	150.6	151.3	151.3	152.0	152.0	152.7	152.7	4
1°	209.0	03.6	210.0	03.7	211.0	03.7	212.0	03.7	213.0	03.7	214.0	03.7	215.0	03.8	216.0	03.8	89°
2	208.9	07.3	209.9	07.3	210.9	07.4	211.9	07.4	212.9	07.4	213.9	07.5	214.9	07.5	215.9	07.5	88
3	208.7	10.9	209.7	11.0	210.7	11.0	211.7	11.1	212.7	11.1	213.7	11.2	214.7	11.3	215.7	11.3	87
4	208.5	14.6	209.5	14.6	210.5	14.7	211.5	14.8	212.5	14.9	213.5	14.9	214.5	15.0	215.5	15.1	86
5	208.2	18.2	209.2	18.3	210.2	18.4	211.2	18.5	212.2	18.6	213.2	18.7	214.2	18.7	215.2	18.8	85
6	207.9	21.8	208.8	22.0	209.8	22.1	210.8	22.2	211.8	22.3	212.8	22.4	213.8	22.5	214.8	22.6	84
7	207.4	25.5	208.4	25.6	209.4	25.7	210.4	25.8	211.4	26.0	212.4	26.1	213.4	26.2	214.4	26.3	83
8	207.0	29.1	208.0	29.2	208.9	29.4	209.9	29.5	210.9	29.6	211.9	29.8	212.9	29.9	213.9	30.1	82
9	206.4	32.7	207.4	32.9	208.4	33.0	209.4	33.2	210.4	33.3	211.4	33.5	212.4	33.6	213.3	33.8	81
10	205.8	36.3	206.8	36.5	207.8	36.6	208.8	36.8	209.8	37.0	210.7	37.2	211.7	37.3	212.7	37.5	80
11	205.2	39.9	206.1	40.1	207.1	40.3	208.1	40.5	209.1	40.6	210.1	40.8	211.0	41.0	212.0	41.2	79
12	204.4	43.5	205.4	43.7	206.4	43.9	207.4	44.1	208.3	44.3	209.3	44.5	210.3	44.7	211.3	44.9	78
13	203.6	47.0	204.6	47.2	205.6	47.5	206.6	47.7	207.5	47.9	208.5	48.1	209.5	48.4	210.5	48.6	77
14	202.8	50.6	203.8	50.8	204.7	51.0	205.7	51.3	206.7	51.5	207.6	51.8	208.6	52.0	209.6	52.3	76
15	201.9	54.1	202.8	54.4	203.8	54.6	204.8	54.9	205.7	55.1	206.7	55.4	207.7	55.6	208.6	55.9	75
16	200.9	57.6	201.9	57.9	202.8	58.2	203.8	58.4	204.7	58.7	205.7	59.0	206.7	59.3	207.6	59.5	74
17	199.9	61.1	200.8	61.4	201.8	61.7	202.7	62.0	203.7	62.3	204.6	62.6	205.6	62.9	206.6	63.2	73
18	198.8	64.6	199.7	64.9	200.7	65.2	201.6	65.5	202.6	65.8	203.5	66.1	204.5	66.4	205.4	66.7	72
19	197.6	68.0	198.6	68.4	199.5	68.7	200.4	69.0	201.4	69.3	202.3	69.7	203.3	70.0	204.2	70.3	71
20	196.4	71.5	197.3	71.8	198.3	72.2	199.2	72.5	200.2	72.9	201.1	73.2	202.0	73.5	203.0	73.9	70
21	195.1	74.9	196.1	75.3	197.0	75.6	197.9	76.0	198.9	76.3	199.8	76.7	200.7	77.0	201.7	77.4	69
22	193.8	78.3	194.7	78.7	195.6	79.0	196.6	79.4	197.5	79.8	198.4	80.2	199.3	80.5	200.3	80.9	68
23	192.4	81.7	193.3	82.1	194.2	82.4	195.1	82.8	196.1	83.2	197.0	83.6	197.9	84.0	198.8	84.4	67
24	190.9	85.0	191.8	85.4	192.8	85.8	193.7	86.2	194.6	86.6	195.5	87.0	196.4	87.4	197.3	87.9	66
25	189.4	88.3	190.3	88.7	191.2	89.2	192.1	89.6	193.0	90.0	193.9	90.4	194.9	90.9	195.8	91.3	65
26	187.8	91.6	188.7	92.1	189.6	92.5	190.5	92.9	191.4	93.4	192.3	93.8	193.2	94.2	194.1	94.7	64
27	186.2	94.9	187.1	95.3	188.0	95.8	188.9	96.2	189.8	96.7	190.7	97.2	191.6	97.6	192.5	98.1	63
28	184.5	98.1	185.4	98.6	186.3	99.1	187.2	99.5	188.1	100.0	189.0	100.5	189.8	100.9	190.7	101.4	62
29	182.8	101.3	183.7	101.8	184.5	102.3	185.4	102.8	186.3	103.3	187.2	103.7	188.0	104.2	188.9	104.7	61
30	181.0	104.5	181.9	105.0	182.7	105.5	183.6	106.0	184.5	106.5	185.3	107.0	186.2	107.5	187.1	108.0	60
31	179.1	107.6	180.0	108.2	180.9	108.7	181.7	109.2	182.6	109.7	183.4	110.2	184.3	110.7	185.1	111.2	59
32	177.2	110.8	178.1	111.3	178.9	111.8	179.8	112.3	180.6	112.9	181.5	113.4	182.3	113.9	183.2	114.5	58
33	175.3	113.8	176.1	114.4	177.0	114.9	177.8	115.5	178.6	116.0	179.5	116.6	180.3	117.1	181.2	117.6	57
34	173.3	116.9	174.1	117.4	174.9	118.0	175.8	118.5	176.6	119.1	177.4	119.7	178.2	120.2	179.1	120.8	56
35	171.2	119.9	172.0	120.5	172.8	121.0	173.7	121.6	174.5	122.2	175.3	122.7	176.1	123.3	176.9	123.9	55
36	169.1	122.8	169.9	123.4	170.7	124.0	171.5	124.6	172.3	125.2	173.1	125.8	173.9	126.4	174.7	127.0	54
37	166.9	125.8	167.7	126.4	168.5	127.0	169.3	127.6	170.1	128.2	170.9	128.8	171.7	129.4	172.5	130.0	53
38	164.7	128.7	165.5	129.3	166.3	129.9	167.1	130.5	167.8	131.1	168.6	131.8	169.4	132.4	170.2	133.0	52
39	162.4	131.5	163.2	132.2	164.0	132.8	164.8	133.4	165.5	134.0	166.3	134.7	167.1	135.3	167.9	135.9	51
40	160.1	134.3	160.9	135.0	161.6	135.6	162.4	136.3	163.2	136.9	163.9	137.6	164.7	138.2	165.5	138.8	50
41	157.7	137.1	158.5	137.8	159.2	138.4	160.0	139.1	160.8	139.7	161.5	140.4	162.3	141.1	163.0	141.7	49
42	155.3	139.8	156.1	140.5	156.8	141.2	157.5	141.9	158.3	142.5	159.0	143.2	159.8	143.9	160.5	144.5	48
43	152.9	142.5	153.6	143.2	154.3	143.9	155.0	144.6	155.8	145.3	156.5	145.9	157.2	146.6	158.0	147.3	47
44	150.3	145.2	151.1	145.9	151.8	146.6	152.5	147.3	153.2	148.0	153.9	148.7	154.7	149.4	155.4	150.0	46
45	147.8	147.8	148.5	148.5	149.2	149.2	149.9	149.9	150.6	150.6	151.3	151.3	152.0	152.0	152.7	152.7	45
Crse.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Crse.

Traverse Table.

Dist.	217		218		219		220		221		222		223		224		
Cnc. Fm.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Cnc. Fm.
¼	216.7	10.7	217.7	10.7	218.7	10.8	219.7	10.8	220.7	10.8	221.7	10.9	222.7	10.9	223.7	11.0	7¾
½	216.0	21.3	216.9	21.4	217.9	21.5	218.9	21.6	219.9	21.7	220.9	21.8	221.9	21.9	222.9	22.0	½
¾	214.6	31.8	215.6	32.0	216.6	32.1	217.6	32.3	218.6	32.4	219.6	32.6	220.6	32.7	221.6	32.9	¼
1	212.8	42.3	213.8	42.5	214.8	42.7	215.8	42.9	216.7	43.1	217.7	43.3	218.7	43.5	219.7	43.7	7
¼	210.5	52.7	211.5	53.0	212.4	53.2	213.4	53.5	214.4	53.7	215.4	53.9	216.3	54.2	217.3	54.4	¾
½	207.7	63.0	208.6	63.3	209.6	63.6	210.5	63.9	211.5	64.1	212.4	64.4	213.4	64.7	214.4	65.0	½
¾	204.3	73.1	205.3	73.4	206.2	73.8	207.1	74.1	208.1	74.4	209.0	74.8	210.0	75.1	210.9	75.5	¼
2	200.5	83.0	201.4	83.4	202.3	83.8	203.3	84.2	204.2	84.6	205.1	85.0	206.0	85.3	207.0	85.7	6
¼	196.2	92.8	197.1	93.2	198.0	93.6	198.9	94.1	199.8	94.5	200.7	94.9	201.6	95.4	202.5	95.8	¾
½	191.4	102.3	192.3	102.8	193.1	103.2	194.0	103.7	194.9	104.2	195.8	104 6	196.7	105.1	197.6	105.6	½
¾	186.1	111.6	187.0	112.1	187.8	112.6	188.7	113.1	189.6	113.6	190.4	114.1	191.3	114.6	192.1	115.2	¼
3	180.4	120.6	181.3	121.1	182.1	121.7	182.9	122.2	183.7	122.8	184.6	123.3	185.4	123.9	186.2	124.4	5
¼	174.3	129.3	175.1	129.9	175.9	130.5	176.7	131.1	177.5	131.7	178.3	132.2	179.1	132.8	179.9	133.4	¾
½	167.7	137.7	168.5	138.3	169.3	138.9	170.1	139.6	170.8	140.2	171.6	140.8	172.4	141.5	173.1	142.1	½
¾	160.8	145.7	161.5	146.4	162.3	147.1	163.0	147.7	163.7	148.4	164.5	149.1	165.2	149.7	166.0	150.4	¼
1	153.4	153.4	154.1	154.1	154.9	154.9	155.6	155.6	156.3	156.3	157.0	157.0	157.7	157.7	158.4	158.4	4
1°	217.0	03.8	218.0	03.8	219.0	03.8	220 0	03.8	221.0	03.9	222.0	03.9	223.0	08.9	224.0	03.9	89°
2	216.9	07.6	217.9	07.6	218.9	07.6	219.9	07.7	220.9	07.7	221.9	07.7	222.9	07.8	223.9	07.8	88
3	216.7	11.4	217.7	11.4	218.7	11.5	219.7	11.5	220.7	11.6	221.7	11.6	222.7	11.7	223.7	11.7	87
4	216.5	15.1	217.5	15.2	218.5	15.3	219.5	15.3	220.5	15.4	221.5	15.5	222.5	15.6	223.5	15.6	86
5	216.2	18.9	217.2	19.0	218.2	19.1	219.2	19.2	220.2	19.3	221.2	19.3	222.2	19.4	223.1	19.5	85
6	215.8	22.7	216.8	22.8	217.8	22.9	218 8	23.0	219.8	23.1	220.8	23.2	221.8	23.3	222.8	23.4	84
7	215.4	26.4	216.4	26.6	217.4	26.7	218.4	26.8	219.4	26.9	220.3	27.1	221.3	27.2	222.3	27.3	83
8	214.9	30.2	215.9	30.3	216.9	30.5	217.9	30.6	218.8	30.8	219.8	30.9	220.8	31.0	221.8	31.2	82
9	214.3	33.9	215.3	34.1	216.3	34.3	217.3	34.4	218.3	34.6	219.3	34.7	220.3	34.9	221.2	35.0	81
10	213.7	37.7	214.7	37.9	215.7	38.0	216.7	38.2	217.6	38.4	218.6	38.5	219.6	38.7	220.6	38.9	80
11	213 0	41.4	214.0	41.6	215.0	41.8	216.0	42.0	216.9	42.2	217.9	42.4	218.9	42.6	219.9	42.7	79
12	212.3	45.1	213.2	45.3	214.2	45.5	215.2	45.7	216.2	45.9	217.1	46.2	218.1	46.4	219.1	46.6	78
13	211.4	48.8	212.4	49.0	213.4	49.3	214.4	49.5	215.3	49.7	216.3	49.9	217.3	50.2	218.3	50.4	77
14	210.6	52.5	211.5	52.7	212.5	53.0	213.5	53.2	214.4	53.5	215.4	53.7	216.4	53.9	217.3	54.2	76
15	209.6	56.2	210.6	56.4	211.5	56.7	212.5	56.9	213.5	57.2	214.4	57.5	215.4	57.7	216.4	58.0	75
16	208.6	59.8	209.6	60.1	210.5	60.4	211.5	60.6	212.4	60.9	213.4	61.2	214.4	61.5	215.3	61.7	74
17	207.5	63.4	208.5	63.7	209.4	64.0	210.4	64.3	211.3	64.6	212.3	64.9	213.3	65.2	214.2	65.5	73
18	206.4	67.1	207.3	67.4	208.3	67.7	209.2	68.0	210.2	68.3	211.1	68.6	212.1	68.9	213.0	69.2	72
19	205.2	70.6	206.1	71.0	207.1	71.3	208.0	71.6	209.0	72.0	209.9	72.3	210.9	72.6	211.8	72.9	71
20	203.9	74.2	204.9	74.6	205.8	74.9	206.7	75.2	207.7	75.6	208.6	75.9	209.6	76.3	210.5	76.6	70
21	202.6	77.8	203.5	78.1	204.5	78.5	205.4	78.8	206.3	79.2	207.3	79.6	208.2	79.9	209.1	80.3	69
22	201.2	81.3	202.1	81.7	203.1	82.0	204.0	82.4	204.9	82.8	205.8	83.2	206.8	83.5	207.7	83.9	68
23	199.7	84.8	200.7	85.2	201.6	85.6	202.5	86.0	203.4	86.4	204.4	86.7	205.3	87.1	206.2	87.5	67
24	198.2	88.3	199.2	88.7	200.1	89.1	201.0	89.5	201.9	89.9	202.8	90.3	203.7	90.7	204.6	91.1	66
25	196.7	91.7	197.6	92.1	198.5	92.6	199.4	93.0	200.3	93.4	201.2	93.8	202.1	94.2	203.0	94.7	65
26	195.0	95.1	195.9	95.6	196.8	96.0	197.7	96.4	198.6	96.9	199.5	97.3	200.4	97.8	201.3	98.2	64
27	193.3	98.5	194.2	99.0	195.1	99.4	196.0	99.9	196.9	100.3	197.8	100.8	198.7	101.2	199.6	101.7	63
28	191.6	101.9	192.5	102.3	193.4	102.8	194.2	103.3	195.1	103.8	196.0	104.2	196.9	104.7	197.8	105.2	62
29	189.8	105.2	190.7	105.7	191.5	106.2	192.4	106.7	193.3	107.1	194.2	107.6	195.0	108.1	195.9	108.6	61
30	187.9	108.5	188.8	109.0	189.7	109.5	190.5	110.0	191.4	110.5	192 3	111.0	193.1	111.5	194.0	112.0	60
31	186.0	111.8	186.9	112.3	187.7	112.8	188.6	113.3	189.4	113.8	190.3	114 3	191.1	114.9	192.0	115.4	59
32	184.0	115.0	184.9	115.5	185.7	116.1	186.6	116.6	187.4	117.1	188.3	117.6	189.1	118.2	190.0	118.7	58
33	182.0	118.2	182.8	118.7	183.7	119.3	184.5	119.8	185.3	120.4	186.2	120.9	187.0	121.5	187.9	122.0	57
34	179.9	121.3	180.7	121.9	181.6	122.5	182.4	123.0	183.2	123.6	184.0	124.1	184.9	124.7	185.7	125.3	56
35	177.8	124.5	178.6	125.0	179.4	125.6	180.2	126.2	181.0	126.8	181.9	127.3	182.7	127.9	183.5	128.5	55
36	175.6	127.5	176.4	128.1	177.2	128.7	178.0	129.3	178.8	129.9	179.6	130.5	180.4	131.1	181.2	131.7	54
37	173.3	130.6	174.1	131.2	174.9	131.8	175.7	132.4	176.5	133.0	177.3	133.6	178.1	134.2	178.9	134.8	53
38	171.0	133.6	171.8	134.2	172.6	134.8	173.4	135.4	174.2	136.1	174.9	136.7	175.7	137.3	176.5	137.9	52
39	168.6	136.6	169.4	137.2	170 2	137.8	171.0	138.5	171.7	139.1	172.5	139.7	173.3	140 3	174.1	141.0	51
40	166.2	139.5	167.0	140.1	167.8	140.8	168.5	141.4	169.3	142.1	170.1	142.7	170.8	143.3	171.6	144.0	50
41	163.8	142.4	164.5	143.0	165.3	143.7	166.0	144.3	166.8	145.0	167.5	145.6	168.3	146.3	169.1	147.0	49
42	161.3	145.2	162.0	145.9	162.7	146.5	163.5	147.2	164.2	147.9	165.0	148.5	165.7	149.2	166.5	149.9	48
43	158.7	148.0	159.4	148.7	160.2	149.4	160.9	150.0	161.6	150.7	162.4	151.4	163.1	152.1	163.8	152.8	47
44	156.1	150.7	156.8	151.4	157.5	152.1	158.3	152.8	159.0	153.5	159.7	154.2	160.4	154.9	161.1	155.6	46
45	153.4	153.4	154.1	154.1	154.9	154.9	155.6	155.6	156.3	156.3	157.0	157.0	157.7	157.7	158.4	158.4	45
Cnc.	Dep.	Diff.Lat.	Dep.	Diff.Lat	Dep.	Diff Lat.	Dep.	Diff.Lat	Dep.	Diff La.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff Lat.	Cnc.

Traverse Table.

Distance.	225		226		227		228		229		230		231		232		
Course.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Course.
Pts																	Pts
¼	224.7	11.0	225.7	11.1	226.7	11.1	227.7	11.2	228.7	11.2	229.7	11.3	230.7	11.3	231.7	11.4	75 ¼
½	223.9	22.1	224.9	22.2	225.9	22.2	226.9	22.3	227.9	22.4	228.9	22.5	229.9	22.6	230.9	22.7	½
¾	222.6	33.0	223.5	33.2	224.5	33.3	225.5	33.4	226.5	33.6	227.5	33.7	228.5	33.9	229.5	34.0	¾
1	220.7	43.9	221.7	44.1	222.6	44.3	223.6	44.5	224.6	44.7	225.6	44.9	226.6	45.1	227.5	45.3	7
¼	218.3	54.7	219.2	54.9	220.2	55.2	221.2	55.4	222.1	55.6	223.1	55.9	224.1	56.1	225.1	56.4	¼
½	215.3	65.3	216.3	65.6	217.2	65.9	218.2	66.2	219.1	66.5	220.1	66.8	221.1	67.0	222.0	67.3	½
¾	211.8	75.8	212.8	76.1	213.7	76.5	214.7	76.8	215.6	77.1	216.5	77.5	217.5	77.8	218.4	78.2	¾
2	207.9	86.1	208.8	86.5	209.7	86.9	210.6	87.3	211.6	87.6	212.5	88.0	213.4	88.4	214.3	88.8	6
¼	203.4	96.2	204.3	96.6	205.2	97.1	206.1	97.5	207.0	97.9	207.9	98.3	208.8	98.8	209.7	99.2	¼
½	198.4	106.1	199.3	106.5	200.2	107.0	201.1	107.5	202.0	107.9	202.8	108.4	203.7	108.9	204.6	109.4	½
¾	193.0	115.7	193.8	116.2	194.7	116.7	195.6	117.2	196.4	117.7	197.3	118.2	198.1	118.8	199.0	119.3	¾
3	187.1	125.0	187.9	125.6	188.7	126.1	189.6	126.7	190.4	127.2	191.2	127.8	192.1	128.3	192.9	128.9	5
¼	180.7	134.0	181.5	134.6	182.3	135.2	183.1	135.8	183.9	136.4	184.7	137.0	185.5	137.6	186.3	138.2	¼
½	173.9	142.7	174.7	143.4	175.5	144.0	176.2	144.6	177.0	145.3	177.8	145.9	178.6	146.5	179.3	147.2	½
¾	166.7	151.1	167.4	151.8	168.2	152.4	168.9	153.1	169.7	153.8	170.4	154.5	171.2	155.1	171.9	155.8	¾
4	159.1	159.1	159.8	159.8	160.5	160.5	161.2	161.2	161.9	161.9	162.6	162.6	163.3	163.3	164.0	164.0	4
1°	225.0	03.9	226.0	03.9	227.0	04.0	228.0	04.0	229.0	04.0	230.0	04.0	231.0	04.0	232.0	04.0	89°
2	224.9	07.9	225.9	07.9	226.9	07.9	227.9	08.0	228.9	08.0	229.9	08.0	230.9	08.1	231.9	08.1	88
3	224.7	11.8	225.7	11.8	226.7	11.9	227.7	11.9	228.7	12.0	229.7	12.0	230.7	12.1	231.7	12.1	87
4	224.5	15.7	225.4	15.8	226.4	15.8	227.4	15.9	228.4	16.0	229.4	16.0	230.4	16.1	231.4	16.2	86
5	224.1	19.6	225.1	19.7	226.1	19.8	227.1	19.9	228.1	20.0	229.1	20.0	230.1	20.1	231.1	20.2	85
6	223.8	23.5	224.8	23.6	225.8	23.7	226.8	23.8	227.7	23.9	228.7	24.0	229.7	24.1	230.7	24.3	84
7	223.3	27.4	224.3	27.5	225.3	27.7	226.3	27.8	227.3	27.9	228.3	28.0	229.3	28.1	230.3	28.3	83
8	222.8	31.3	223.8	31.5	224.8	31.6	225.8	31.7	226.8	31.9	227.8	32.0	228.8	32.1	229.7	32.3	82
9	222.2	35.2	223.2	35.4	224.2	35.5	225.2	35.7	226.2	35.8	227.2	36.0	228.2	36.1	229.1	36.3	81
10	221.6	39.1	222.6	39.2	223.6	39.4	224.5	39.6	225.5	39.8	226.5	39.9	227.5	40.1	228.5	40.3	80
11	220.9	42.9	221.8	43.1	222.8	43.3	223.8	43.5	224.8	43.7	225.8	43.9	226.8	44.1	227.7	44.3	79
12	220.1	46.8	221.1	47.0	222.0	47.2	223.0	47.4	224.0	47.6	225.0	47.8	226.0	48.0	226.9	48.2	78
13	219.2	50.6	220.2	50.8	221.2	51.1	222.2	51.3	223.1	51.5	224.1	51.7	225.1	52.0	226.1	52.2	77
14	218.3	54.4	219.3	54.7	220.3	54.9	221.2	55.2	222.2	55.4	223.2	55.6	224.1	55.9	225.1	56.1	76
15	217.3	58.2	218.3	58.5	219.3	58.8	220.2	59.0	221.2	59.3	222.2	59.5	223.1	59.8	224.1	60.0	75
16	216.3	62.0	217.2	62.3	218.2	62.6	219.2	62.8	220.1	63.1	221.1	63.4	222.1	63.7	223.0	63.9	74
17	215.2	65.8	216.1	66.1	217.1	66.4	218.0	66.7	219.0	67.0	220.0	67.2	220.9	67.5	221.9	67.8	73
18	214.0	69.5	214.9	69.8	215.9	70.1	216.8	70.5	217.8	70.8	218.7	71.1	219.7	71.4	220.6	71.7	72
19	212.7	73.3	213.7	73.6	214.6	73.9	215.6	74.2	216.5	74.6	217.5	74.9	218.4	75.2	219.4	75.5	71
20	211.4	77.0	212.4	77.3	213.3	77.6	214.2	78.0	215.2	78.3	216.1	78.7	217.1	79.0	218.0	79.3	70
21	210.1	80.6	211.0	81.0	211.9	81.3	212.9	81.7	213.8	82.1	214.7	82.4	215.7	82.8	216.6	83.1	69
22	208.6	84.3	209.5	84.7	210.5	85.0	211.4	85.4	212.3	85.8	213.3	86.2	214.2	86.5	215.1	86.9	68
23	207.1	87.9	208.0	88.3	209.0	88.7	209.9	89.1	210.8	89.5	211.7	89.9	212.6	90.3	213.6	90.6	67
24	205.5	91.5	206.5	91.9	207.4	92.3	208.3	92.7	209.2	93.1	210.1	93.5	211.0	94.0	211.9	94.4	66
25	203.9	95.1	204.8	95.5	205.7	95.9	206.6	96.4	207.5	96.8	208.5	97.2	209.4	97.6	210.3	98.0	65
26	202.2	98.6	203.1	99.1	204.0	99.5	204.9	99.9	205.8	100.4	206.7	100.8	207.6	101.3	208.5	101.7	64
27	200.5	102.1	201.4	102.6	202.3	103.1	203.1	103.5	204.0	104.0	204.9	104.4	205.8	104.9	206.7	105.3	63
28	198.7	105.6	199.5	106.1	200.4	106.6	201.3	107.0	202.2	107.5	203.1	108.0	204.0	108.4	204.8	108.9	62
29	196.8	109.1	197.7	109.6	198.5	110.1	199.4	110.5	200.3	111.0	201.2	111.5	202.0	112.0	202.9	112.5	61
30	194.9	112.5	195.7	113.0	196.6	113.5	197.5	114.0	198.3	114.5	199.2	115.0	200.1	115.5	200.9	116.0	60
31	192.9	115.9	193.7	116.4	194.6	116.9	195.4	117.4	196.3	117.9	197.1	118.5	198.0	119.0	198.9	119.5	59
32	190.8	119.2	191.7	119.8	192.5	120.3	193.4	120.8	194.2	121.4	195.1	121.9	195.9	122.4	196.7	122.9	58
33	188.7	122.5	189.5	123.1	190.4	123.6	191.2	124.2	192.1	124.7	192.9	125.3	193.7	125.8	194.6	126.4	57
34	186.5	125.8	187.4	126.4	188.2	126.9	189.0	127.5	189.8	128.1	190.7	128.6	191.5	129.2	192.3	129.7	56
35	184.3	129.1	185.1	129.6	185.9	130.2	186.8	130.8	187.6	131.3	188.4	131.9	189.2	132.5	190.0	133.1	55
36	182.0	132.3	182.8	132.8	183.6	133.4	184.5	134.0	185.3	134.6	186.1	135.2	186.9	135.8	187.7	136.4	54
37	179.7	135.4	180.5	136.0	181.3	136.6	182.1	137.2	182.9	137.8	183.7	138.4	184.5	139.0	185.3	139.6	53
38	177.3	138.5	178.1	139.1	178.9	139.8	179.7	140.4	180.5	141.0	181.2	141.6	182.0	142.2	182.8	142.8	52
39	174.9	141.6	175.6	142.2	176.4	142.9	177.2	143.5	178.0	144.1	178.7	144.7	179.5	145.4	180.2	46.0	51
40	172.4	144.6	173.1	145.3	173.9	145.9	174.7	146.6	175.4	147.2	176.2	147.8	177.0	148.5	177.7	149.1	50
41	169.8	147.6	170.6	148.3	171.3	148.9	172.1	149.6	172.8	150.2	173.6	150.9	174.3	151.5	175.1	152.2	49
42	167.2	150.6	168.0	151.2	168.7	151.9	169.4	152.6	170.2	153.2	170.9	153.9	171.7	154.6	172.4	155.2	48
43	164.6	153.4	165.3	154.1	166.0	154.8	166.7	155.5	167.5	156.2	168.2	156.9	168.9	157.5	169.7	158.2	47
44	161.9	156.3	162.6	157.0	163.3	157.7	164.0	158.4	164.7	159.1	165.4	159.8	166.2	160.5	166.9	161.2	46
45	159.1	159.1	159.8	159.8	160.5	160.5	161.2	161.2	161.9	161.9	162.6	162.6	163.3	163.3	164.0	164.0	45
Course.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Course.

Traverse Table.

Distance	233		234		235		236		237		238		239		240		
Course	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Course
¼	232.7	11.4	233.7	11.5	234.7	11.5	235.7	11.6	236.7	11.6	237.7	11.7	238.7	11.7	239.7	11.8	7½
½	231.9	22.8	232.9	22.9	233.9	23.0	234.9	23.1	235.9	23.2	236.9	23.3	237.8	23.4	238.8	23.5	
¾	230.5	34.2	231.5	34.3	232.4	34.5	233.4	34.6	234.4	34.8	235.4	34.9	236.4	35.1	237.4	35.2	
1	228.5	45.5	229.5	45.7	230.5	45.8	231.5	46.0	232.4	46.2	233.4	46.4	234.4	46.6	235.4	46.8	7
¼	226.0	56.6	227.0	56.9	228.0	57.1	228.9	57.3	229.9	57.6	230.9	57.8	231.8	58.1	232.8	58.3	
½	223.0	67.6	223.9	67.9	224.9	68.2	225.8	68.5	226.8	68.8	227.8	69.1	228.7	69.4	229.7	69.7	
¾	219.4	78.5	220.3	78.8	221.3	79.2	222.2	79.5	223.1	79.8	224.1	80.2	225.0	80.5	226.0	80.8	
2	215.3	89.2	216.2	89.6	217.1	89.9	218.0	90.3	219.0	90.7	219.9	91.1	220.8	91.5	221.7	91.8	6
¼	210.6	99.6	211.5	100.1	212.4	100.5	213.3	100.9	214.2	101.3	215.1	101.8	216.1	102.2	217.0	102.6	
½	205.5	109.8	206.4	110.3	207.3	110.8	208.1	111.2	209.0	111.7	209.9	112.2	210.8	112.7	211.7	113.1	
¾	199.8	119.8	200.7	120.3	201.6	120.8	202.4	121.3	203.3	121.8	204.1	122.4	205.0	122.9	205.9	123.4	
3	193.7	129.4	194.6	130.0	195.4	130.6	196.2	131.1	197.1	131.7	197.9	132.2	198.7	132.8	199.5	133.3	5
¼	187.1	138.8	187.9	139.4	188.8	140.0	189.6	140.6	190.4	141.2	191.2	141.8	192.0	142.4	192.8	143.0	
½	180.1	147.8	180.9	148.4	181.7	149.1	182.4	149.7	183.2	150.3	184.0	151.0	184.7	151.6	185.5	152.3	
¾	172.6	156.5	173.4	157.1	174.1	157.8	174.9	158.5	175.6	159.1	176.3	159.8	177.1	160.5	177.8	161.2	
4	164.8	164.8	165.5	165.5	166.2	166.2	166.9	166.9	167.6	167.6	168.3	168.3	169.0	169.0	169.7	169.7	4

1	233.0	04.1	234.0	04.1	235.0	04.1	236.0	04.1	237.0	04.1	238.0	04.2	239.0	04.2	240.0	04.2	89	
2	232.9	08.1	233.9	08.2	234.9	08.2	235.9	08.2	236.9	08.3	237.9	08.3	238.9	08.3	239.9	08.4	88	
3	232.7	12.2	233.7	12.2	234.7	12.3	235.7	12.4	236.7	12.4	237.7	12.5	238.7	12.5	239.7	12.6	87	
4	232.4	16.3	233.4	16.3	234.4	16.4	235.4	16.5	236.4	16.5	237.4	16.6	238.4	16.7	239.4	16.7	86	
5	232.1	20.3	233.1	20.4	234.1	20.5	235.1	20.6	236.1	20.7	237.1	20.7	238.1	20.8	239.1	20.9	85	
6	231.7	24.4	232.7	24.5	233.7	24.6	234.7	24.7	235.7	24.8	236.7	24.9	237.7	25.0	238.7	25.1	84	
7	231.3	28.4	232.3	28.5	233.2	28.6	234.2	28.8	235.2	28.9	236.2	29.0	237.2	29.1	238.2	29.2	83	
8	230.7	32.4	231.7	32.6	232.7	32.7	233.7	32.8	234.7	33.0	235.7	33.1	236.7	33.3	237.7	33.4	82	
9	230.1	36.4	231.1	36.6	232.1	36.8	233.1	36.9	234.1	37.1	235.1	37.2	236.1	37.4	237.0	37.5	81	
10	229.5	40.5	230.4	40.6	231.4	40.8	232.4	41.0	233.4	41.2	234.4	41.3	235.4	41.5	236.4	41.7	80	
11	228.7	44.5	229.7	44.6	230.7	44.8	231.7	45.0	232.6	45.2	233.6	45.4	234.6	45.6	235.6	45.8	79	
12	227.9	48.4	228.9	48.7	229.9	48.9	230.8	49.1	231.8	49.3	232.8	49.5	233.8	49.7	234.8	49.9	78	
13	227.0	52.4	228.0	52.6	229.0	52.9	230.0	53.1	230.9	53.3	231.9	53.5	232.9	53.8	233.8	54.0	77	
14	226.1	56.4	227.0	56.6	228.0	56.9	229.0	57.1	230.0	57.3	230.9	57.6	231.9	57.8	232.9	58.1	76	
15	225.1	60.3	226.0	60.6	227.0	60.8	228.0	61.1	228.9	61.3	229.9	61.6	230.9	61.9	231.8	62.1	75	
16	224.0	64.2	224.9	64.5	225.9	64.8	226.9	65.1	227.8	65.3	228.8	65.6	229.7	65.9	230.7	66.2	74	
17	222.8	68.1	223.8	68.4	224.7	68.7	225.7	69.0	226.6	69.3	227.6	69.6	228.6	69.9	229.5	70.2	73	
18	221.6	72.0	222.5	72.3	223.5	72.6	224.4	72.9	225.4	73.2	226.4	73.5	227.3	73.9	228.3	74.2	72	
19	220.3	75.9	221.3	76.2	222.2	76.5	223.1	76.8	224.1	77.2	225.0	77.5	226.0	77.8	226.9	78.1	71	
20	218.9	79.7	219.9	80.0	220.8	80.4	221.8	80.7	222.7	81.1	223.6	81.4	224.6	81.7	225.5	82.1	70	
21	217.5	83.5	218.5	83.9	219.4	84.2	220.3	84.6	221.3	84.9	222.2	85.3	223.1	85.6	224.1	86.0	69	
22	216.0	87.3	217.0	87.7	217.9	88.0	218.8	88.4	219.7	88.8	220.7	89.2	221.6	89.5	222.5	89.9	68	
23	214.5	91.0	215.4	91.4	216.3	91.8	217.2	92.2	218.2	92.6	219.1	93.0	220.0	93.4	220.9	93.8	67	
24	212.9	94.8	213.8	95.2	214.7	95.6	215.6	96.0	216.5	96.4	217.4	96.8	218.3	97.2	219.3	97.6	66	
25	211.2	98.5	212.1	98.9	213.0	99.3	213.9	99.7	214.8	100.2	215.7	100.6	216.6	101.0	217.5	101.4	65	
26	209.4	102.1	210.3	102.6	211.2	103.0	212.1	103.5	213.0	103.9	213.9	104.3	214.8	104.8	215.7	105.2	64	
27	207.6	105.8	208.5	106.2	209.4	106.7	210.3	107.1	211.2	107.6	212.1	108.0	213.0	108.5	213.8	109.0	63	
28	205.7	109.4	206.6	109.9	207.5	110.3	208.4	110.8	209.3	111.3	210.1	111.7	211.0	112.2	211.9	112.7	62	
29	203.8	113.0	204.7	113.4	205.5	113.9	206.4	114.4	207.3	114.9	208.2	115.4	209.0	115.9	209.9	116.4	61	
30	201.8	116.5	202.6	117.0	203.5	117.5	204.4	118.0	205.2	118.5	206.1	119.0	207.0	119.5	207.8	120.0	60	
31	199.7	120.0	200.6	120.5	201.4	121.0	202.3	121.5	203.1	122.1	204.0	122.6	204.9	123.1	205.7	123.6	59	
32	197.6	123.5	198.4	124.0	199.3	124.5	200.1	125.1	201.0	125.6	201.8	126.1	202.7	126.7	203.5	127.2	58	
33	195.4	126.9	196.2	127.4	197.1	128.0	197.9	128.5	198.8	129.1	199.6	129.6	200.4	130.2	201.3	130.7	57	
34	193.2	130.3	194.0	130.9	194.8	131.4	195.7	132.0	196.5	132.5	197.3	133.1	198.1	133.6	199.0	134.2	56	
35	190.9	133.6	191.7	134.2	192.5	134.8	193.3	135.4	194.1	135.9	195.0	136.5	195.8	137.1	196.6	137.7	55	
36	188.5	137.0	189.3	137.5	190.1	138.1	190.9	138.7	191.7	139.3	192.5	139.9	193.4	140.5	194.2	141.1	54	
37	186.1	140.2	186.9	140.8	187.7	141.4	188.5	142.0	189.3	142.6	190.1	143.2	190.9	143.8	191.7	144.4	53	
38	183.6	143.4	184.4	144.1	185.2	144.7	186.0	145.3	186.8	145.9	187.5	146.5	188.3	147.1	189.1	147.8	52	
39	181.1	146.6	181.9	147.3	182.6	147.9	183.4	148.5	184.2	149.1	185.0	149.8	185.7	150.4	186.5	151.0	51	
40	178.5	149.8	179.3	150.4	180.0	151.1	180.8	151.7	181.6	152.3	182.3	153.0	183.1	153.6	183.9	154.3	50	
41	175.8	152.9	176.6	153.5	177.4	154.2	178.1	154.8	178.9	155.5	179.6	156.1	180.4	156.8	181.1	157.5	49	
42	173.2	155.9	173.9	156.6	174.6	157.2	175.4	157.9	176.1	158.6	176.9	159.3	177.6	159.9	178.4	160.6	48	
43	170.4	158.9	171.1	159.6	171.9	160.3	172.6	161.0	173.3	161.6	174.1	162.3	174.8	163.0	175.5	163.7	47	
44	167.6	161.9	168.3	162.6	169.0	163.2	169.8	163.9	170.5	164.6	171.2	165.3	171.9	166.0	172.6	166.7	46	
45	164.8	164.8	165.5	165.5	166.2	166.2	166.9	166.9	167.6	167.6	168.3	168.3	169.0	169.0	169.7	169.7	45	
Course	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Course	

Traverse Table.

Distance.	241		242		243		244		245		246		247		248		
Cross Pts.	Diff. Lat	Dep.	Diff. Lat	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Cross Pts.
¼	240.7	11.8	241.7	11.9	242.7	11.9	243.7	12.0	244.7	12.0	245.7	12.1	246.7	12.1	247.7	12.2	7¾
½	239.8	23.6	240.8	23.7	241.8	23.8	242.8	23.9	243.8	24.0	244.8	24.1	245.8	24.2	246.8	24.3	½
¾	238.4	35.4	239.4	35.5	240.4	35.7	241.4	35.8	242.3	35.9	243.3	36.1	244.3	36.2	245.3	36.4	¼
1	236.4	47.0	237.3	47.2	238.3	47.4	239.3	47.6	240.3	47.8	241.3	48.0	242.3	48.2	243.2	48.4	7
¼	233.8	58.6	234.7	58.8	235.7	59.0	236.7	59.3	237.7	59.5	238.6	59.8	239.6	60.0	240.6	60.3	¾
½	230.6	70.0	231.6	70.2	232.5	70.5	233.5	70.8	234.5	71.1	235.4	71.4	236.4	71.7	237.3	72.0	½
¾	226.9	81.2	227.8	81.5	228.8	81.9	229.7	82.2	230.7	82.5	231.6	82.9	232.6	83.2	233.5	83.5	¼
2	222.7	92.2	223.6	92.6	224.5	93.0	225.4	93.4	226.4	93.8	227.3	94.1	228.2	94.5	229.1	94.9	6
¼	217.9	103.0	218.8	103.5	219.7	103.9	220.6	104.3	221.5	104.8	222.4	105.2	223.3	105.6	224.2	106.0	¾
½	212.5	113.6	213.4	114.1	214.3	114.6	215.2	115.0	216.1	115.5	217.0	116.0	217.8	116.4	218.7	116.9	½
¾	206.7	123.9	207.6	124.4	208.4	124.9	209.3	125.4	210.1	125.9	211.0	126.5	211.9	127.0	212.7	127.5	¼
3	200.4	133.9	201.2	134.4	202.0	135.0	202.9	135.6	203.7	136.1	204.5	136.7	205.4	137.2	206.2	137.8	5
¼	193.6	143.6	194.4	144.2	195.2	144.8	196.0	145.4	196.8	146.0	197.6	146.5	198.4	147.1	199.2	147.7	¾
½	186.3	152.9	187.1	153.5	187.8	154.2	188.6	154.8	189.4	155.4	190.2	156.1	190.9	156.7	191.7	157.3	½
¾	178.6	161.8	179.3	162.5	180.0	163.2	180.8	163.8	181.5	164.5	182.3	165.2	183.0	165.9	183.8	166.5	¼
4	170.4	170.4	171.1	171.1	171.8	171.8	172.5	172.5	173.2	173.2	173.9	173.9	174.7	174.7	175.4	175.4	4
1°	241.0	04.2	242.0	04.2	243.0	04.2	244.0	04.3	245.0	04.3	246.0	04.3	247.0	04.3	248.0	04.3	89°
2	240.9	08.4	241.9	08.4	242.9	08.5	243.9	08.5	244.9	08.6	245.9	08.6	246.8	08.6	247.8	08.7	88
3	240.7	12.6	241.7	12.7	242.7	12.7	243.7	12.8	244.7	12.8	245.7	12.9	246.7	12.9	247.7	13.0	87
4	240.4	16.8	241.4	16.9	242.4	17.0	243.4	17.0	244.4	17.1	245.4	17.2	246.4	17.2	247.4	17.3	86
5	240.1	21.0	241.1	21.1	242.1	21.2	243.1	21.3	244.1	21.4	245.1	21.4	246.1	21.5	247.1	21.6	85
6	239.7	25.2	240.7	25.3	241.7	25.4	242.7	25.5	243.7	25.6	244.7	25.7	245.6	25.8	246.6	25.9	84
7	239.2	29.4	240.2	29.5	241.2	29.6	242.2	29.7	243.2	29.9	244.2	30.0	245.2	30.1	246.2	30.2	83
8	238.7	33.5	239.6	33.7	240.6	33.8	241.6	34.0	242.6	34.1	243.6	34.2	244.6	34.4	245.6	34.5	82
9	238.0	37.7	239.0	37.9	240.0	38.0	241.0	38.2	242.0	38.3	243.0	38.5	244.0	38.6	244.9	38.8	81
10	237.3	41.8	238.3	42.0	239.3	42.2	240.3	42.4	241.3	42.5	242.3	42.7	243.2	42.9	244.2	43.1	80
11	236.6	46.0	237.6	46.2	238.5	46.4	239.5	46.6	240.5	46.7	241.5	46.9	242.5	47.1	243.4	47.3	79
12	235.7	50.1	236.7	50.3	237.7	50.5	238.7	50.7	239.6	50.9	240.6	51.1	241.6	51.4	242.6	51.6	78
13	234.8	54.2	235.8	54.4	236.8	54.7	237.7	54.9	238.7	55.1	239.7	55.3	240.7	55.6	241.6	55.8	77
14	233.8	58.3	234.8	58.5	235.8	58.8	236.8	59.0	237.7	59.3	238.7	59.5	239.7	59.8	240.6	60.0	76
15	232.8	62.4	233.8	62.6	234.7	62.9	235.7	63.2	236.7	63.4	237.6	63.7	238.6	63.9	239.5	64.2	75
16	231.7	66.4	232.6	66.7	233.6	67.0	234.5	67.3	235.5	67.5	236.5	67.8	237.4	68.1	238.4	68.4	74
17	230.5	70.5	231.4	70.8	232.4	71.0	233.3	71.3	234.3	71.6	235.3	71.9	236.2	72.2	237.2	72.5	73
18	229.2	74.5	230.2	74.8	231.1	75.1	232.1	75.4	233.0	75.7	234.0	76.0	234.9	76.3	235.9	76.6	72
19	227.9	78.5	228.8	78.8	229.8	79.1	230.7	79.4	231.7	79.8	232.6	80.1	233.5	80.4	234.5	80.7	71
20	226.5	82.4	227.4	82.8	228.3	83.1	229.3	83.5	230.2	83.8	231.2	84.1	232.1	84.5	233.0	84.8	70
21	225.0	86.4	225.9	86.7	226.9	87.1	227.8	87.4	228.7	87.8	229.7	88.2	230.6	88.5	231.5	88.9	69
22	223.5	90.3	224.4	90.7	225.3	91.0	226.2	91.4	227.2	91.8	228.1	92.2	229.0	92.5	229.9	92.9	68
23	221.8	94.2	222.8	94.6	223.7	94.9	224.6	95.3	225.5	95.7	226.4	96.1	227.4	96.5	228.3	96.9	67
24	220.2	98.0	221.1	98.4	222.0	98.8	222.9	99.2	223.8	99.7	224.7	100.1	225.6	100.5	226.6	100.9	66
25	218.4	101.9	219.3	102.3	220.2	102.7	221.1	103.1	222.0	103.5	223.0	104.0	223.9	104.4	224.8	104.8	65
26	216.6	105.6	217.5	106.1	218.4	106.5	219.3	107.0	220.2	107.4	221.1	107.8	222.0	108.3	222.9	108.7	64
27	214.7	109.4	215.6	109.9	216.5	110.3	217.4	110.8	218.3	111.2	219.2	111.7	220.1	112.1	221.0	112.6	63
28	212.8	113.1	213.7	113.6	214.6	114.1	215.4	114.6	216.3	115.0	217.2	115.5	218.1	116.0	219.0	116.4	62
29	210.8	116.8	211.7	117.3	212.5	117.8	213.4	118.3	214.3	118.8	215.2	119.3	216.0	119.7	216.9	120.2	61
30	208.7	120.5	209.6	121.0	210.4	121.5	211.3	122.0	212.2	122.5	213.0	123.0	213.9	123.5	214.8	124.0	60
31	206.6	124.1	207.4	124.6	208.3	125.2	209.1	125.7	210.0	126.2	210.9	126.7	211.7	127.2	212.6	127.7	59
32	204.4	127.7	205.2	128.2	206.1	128.8	206.9	129.3	207.8	129.8	208.6	130.4	209.5	130.9	210.3	131.4	58
33	202.1	131.3	203.0	131.8	203.8	132.3	204.6	132.9	205.5	133.4	206.3	134.0	207.2	134.5	208.0	135.1	57
34	199.8	134.8	200.6	135.3	201.5	135.9	202.3	136.4	203.1	137.0	203.9	137.6	204.8	138.1	205.6	138.7	56
35	197.4	138.2	198.2	138.8	199.1	139.4	199.9	140.0	200.7	140.5	201.5	141.1	202.3	141.7	203.1	142.2	55
36	195.0	141.7	195.8	142.2	196.6	142.8	197.4	143.4	198.2	144.0	199.0	144.6	199.8	145.2	200.6	145.8	54
37	192.5	145.0	193.3	145.6	194.1	146.2	194.9	146.8	195.7	147.4	196.5	148.0	197.3	148.6	198.1	149.3	53
38	189.9	148.4	190.7	149.0	191.5	149.6	192.3	150.2	193.1	150.8	193.9	151.5	194.6	152.1	195.4	152.7	52
39	187.3	151.7	188.1	152.3	188.8	152.9	189.6	153.6	190.4	154.2	191.2	154.8	192.0	155.4	192.7	156.1	51
40	184.6	154.9	185.4	155.6	186.1	156.2	186.9	156.8	187.7	157.5	188.4	158.1	189.2	158.8	190.0	159.4	50
41	181.9	158.1	182.6	158.8	183.4	159.4	184.1	160.1	184.9	160.7	185.7	161.4	186.4	162.0	187.2	162.7	49
42	179.1	161.3	179.8	161.9	180.6	162.6	181.3	163.3	182.1	163.9	182.8	164.6	183.6	165.3	184.3	165.9	48
43	176.3	164.4	177.0	165.0	177.7	165.7	178.5	166.4	179.2	167.1	179.9	167.8	180.6	168.5	181.4	169.1	47
44	173.4	167.4	174.1	168.1	174.8	168.8	175.5	169.5	176.2	170.2	177.0	170.9	177.7	171.6	178.4	172.3	46
45	170.4	170.4	171.1	171.1	171.8	171.8	172.5	172.5	173.2	173.2	173.9	173.9	174.7	174.7	175.4	175.4	45
Cross.	Dep.	Diff. Lat.	Dep.	Diff Lat.	Dep.	Diff Lat.	Dep.	Diff Lat.	Dep.	Diff Lat.	Dep.	Diff Lat.	Dep.	Diff Lat.	Dep.	Diff Lat.	Cross.

Traverse Table.

Distance.	249		250		251		252		253		254		255		256		
Cras.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Cras.
Fms.																	Fms.
¼	248.7	12.2	249.7	12.3	250.7	12.3	251.7	12.4	252.7	12.4	253.7	12.5	254.7	12.5	255.7	12.6	7¾
½	247.8	24.4	248.8	24.5	249.8	24.6	250.8	24.7	251.8	24.8	252.8	24.9	253.8	25.0	254.8	25.1	½
¾	246.3	36.5	247.3	36.7	248.3	36.8	249.3	37.0	250.3	37.1	251.2	37.3	252.2	37.4	253.2	37.6	¼
1	244.2	48.6	245.2	48.8	246.2	49.0	247.2	49.2	248.1	49.4	249.1	49.6	250.1	49.7	251.1	49.9	7
¼	241.5	60.5	242.5	60.7	243.5	61.0	244.5	61.2	245.4	61.5	246.4	61.7	247.4	62.0	248.3	62.2	¾
½	238.3	72.3	239.2	72.6	240.2	72.9	241.2	73.1	242.1	73.4	243.1	73.7	244.0	74.0	245.0	74.3	½
¾	234.4	83.9	235.4	84.2	236.3	84.6	237.3	84.9	238.2	85.2	239.1	85.6	240.1	85.9	241.0	86.2	¼
2	230.1	95.3	231.0	95.7	231.9	96.1	232.8	96.4	233.7	96.8	234.7	97.2	235.6	97.6	236.5	98.0	6
¼	225.1	106.5	226.0	106.9	226 9	107.3	227.8	107.8	228.7	108.2	229.6	108.6	230.5	109.0	231.4	109.5	¾
½	219.6	117.4	220.5	117.8	221.4	118.3	222.2	118.8	223.1	119.3	224.0	119.7	224.9	120.2	225.8	120.7	½
¾	213.6	128.0	214.4	128.5	215.3	129.0	216.1	129.5	217.0	130.1	217.9	130.6	218.7	131.1	219.6	131.6	¼
3	207.0	138.3	207.9	138.9	208.7	139.4	209.5	140.0	210.4	140.6	211.2	141.1	212.0	141.7	212.9	142.2	5
¼	200.0	148.3	200.8	148.9	201.6	149.5	202.4	150.1	203.2	150.7	204.0	151.3	204.8	151.9	2 5.6	152.5	¾
½	192.5	158.0	193.2	158.6	194.0	159.2	194.8	159.9	195.6	160.5	196.3	161.1	197.1	161.8	197.9	162.4	½
¾	184.5	167.2	185.2	167.9	186.0	168.5	186.7	169.2	187.5	169.9	188.2	170.6	188.9	171.2	189.7	171.9	¼
4	176.1	176.1	176.8	176.8	177.5	177.5	178.2	178.2	178.9	178.9	179.6	179.6	180.3	180.3	181.0	181.0	4
1°	249.0	04.3	250.0	04.4	251.0	04.4	252.0	04.4	253.0	04.4	254.0	04.4	255.0	04.5	256.0	04.5	89°
2	248.8	08.7	249.8	08.7	250.8	08.8	251.8	08.8	252.8	08.8	253.8	08.9	254.8	08.9	255.8	08.9	88
3	248.7	13.0	249.7	13.1	250.7	13.1	251.7	13.2	252.7	13.2	253.7	13.3	254.7	13.3	255.6	13.4	87
4	248.4	17.4	249.4	17.4	250.4	17.5	251.4	17.6	252.4	17.6	253.4	17.7	254.4	17.8	255.4	17.9	86
5	248.1	21.7	249.0	21.8	250.0	21.9	251.0	22.0	252.0	22.1	253.0	22.1	254.0	22.2	255.0	22.3	85
6	247.6	26.0	248.6	26.1	249.6	26.2	250.6	26.3	251.6	26.4	252.6	26.6	253.6	26.7	254.6	26.8	84
7	247.1	30.3	248.1	30.5	249.1	30.6	250.1	30.7	251.1	30.8	252.1	31.0	253.1	31.1	254.1	31.2	83
8	246.6	34.7	247.6	34.8	248.6	34.9	249.5	35.1	250.5	35.2	251.5	35.3	252.5	35.5	253.5	35.6	82
9	245.9	39.0	246.9	39.1	247.9	39.3	248.9	39.4	249.9	39.6	250.9	39.7	251.9	39.9	252.8	40.0	81
10	245.2	43.2	246.2	43.4	247.2	43.6	248.2	43.8	249.2	43.9	250.1	44.1	251.1	44.3	252.1	44.5	80
11	244.4	47.5	245.4	47.7	246.4	47.9	247.4	48.1	248.4	48.3	249.3	48.5	250.3	48.7	251.3	48.8	79
12	243.6	51.8	244.5	52.0	245.5	52.2	246.5	52.4	247.5	52.6	248.4	52.8	249.4	53.0	250.4	53.2	78
13	242.6	56.0	243.6	56.2	244.6	56.5	245.5	56.7	246.5	56.9	247.5	57.1	248.5	57.4	249.4	57.6	77
14	241.6	60.2	242.6	60.5	243.5	60.7	244.5	61.0	245.5	61.2	246.5	61.4	247.4	61.7	248.4	61.9	76
15	240.5	64.4	241.5	64.7	242.4	65.0	243.4	65.2	244.4	65.5	245.3	65.7	246.3	66.0	247.3	66.3	75
16	239.4	68.6	240.3	68.9	241.3	69.2	242.2	69.5	243.2	69.7	244.2	70.0	245.1	70.3	246.1	70.6	74
17	238.1	72.8	239.1	73.1	240.0	73.4	241.0	73.7	241.9	74.0	242.9	74.3	243.9	74.6	244.8	74.8	73
18	236.8	76.9	237.8	77.3	238.7	77.6	239.7	77.9	240.6	78.2	241.6	78.5	242.5	78.8	243.5	79.1	72
19	235.4	81.1	236.4	81.4	237.3	81.7	238.3	82.0	239.2	82.4	240.2	82.7	241.1	83.0	242.1	83.3	71
20	234.0	85.2	234.9	85.5	235.9	85.8	236.8	86.2	237.7	86.5	238.7	86.9	239.6	87.2	240.6	87.6	70
21	232.5	89.2	233.4	89.6	234.3	90.0	235.3	90.3	236.2	90.7	237.1	91.0	238.1	91.4	239.0	91.7	69
22	230.9	93.3	231.8	93.7	232.7	94.0	233.7	94.4	234.6	94.8	235.5	95.2	236.4	95.5	237.4	95.9	68
23	229.2	97.3	230.1	97.7	231.0	98.1	232.0	98.5	232.9	98.9	233.8	99.2	234.7	99.6	235.6	100.0	67
24	227.5	101.3	228.4	101.7	229.3	102.1	230.2	102.5	231.1	102.9	232.0	103.3	233.0	103.7	233.9	104.1	66
25	225.7	105.2	226.6	105.7	227.5	106.1	228.4	106.5	229.3	106.9	230.2	107.3	231.1	107.8	232.0	108.2	65
26	223.8	109.2	224.7	109.6	225.6	110.0	226.5	110.5	227.4	110.9	228.3	111.3	229.2	111.8	230.1	112.2	64
27	221.9	113.0	222.8	113.5	223.6	114.0	224.5	114.4	225.4	114.9	226.3	115.3	227.2	115.8	228.1	116.2	63
28	219.9	116.9	220.7	117.4	221.6	117.8	222.5	118.3	223.4	118.8	224.3	119.2	225.2	119.7	226.0	120.2	62
29	217.8	120.7	218.7	121.2	219.5	121.7	220.4	122.2	221.3	122.7	222.2	123.1	223.0	123.6	223.9	124.1	61
30	215.6	124.5	216.5	125.0	217.4	125.5	218.2	126.0	219.1	126.5	220.0	127.0	220.8	127.5	221.7	128.0	60
31	213.4	128.2	214.3	128.8	215.1	129.3	216.0	129.8	216.9	130.3	217.7	130.8	218.6	131.3	219.4	131.8	59
32	211.2	131.9	212.0	132.5	212.9	133.0	213.7	133.5	214.6	134.1	215.4	134.6	216.3	135.1	217.1	135.7	58
33	208.8	135.6	209.7	136.2	210.5	136.7	211.3	137.2	212.2	137.8	213.0	138.3	213.9	138.9	214.7	139.4	57
34	206.4	139.2	207.3	139.8	208.1	140.4	208.9	140.9	209.7	141.5	210.6	142.0	211.4	142.6	212.2	143.2	56
35	204.0	142.8	204.8	143.4	205.6	144.0	206.4	144.5	207.2	145.1	208.1	145.7	208.9	146.3	209.7	146.8	55
36	201.4	146.4	202.3	146 9	203.1	147.5	203.9	148.1	204.7	148.7	205.5	149.3	206.3	149.9	207.1	150.5	54
37	198.9	149.9	199.7	150.5	200.5	151.1	201.3	151.7	202.1	152.3	202.9	152.9	203.7	153.5	204.5	154.1	53
38	196.2	153.3	197.0	153.9	197.8	154.5	198.6	155.1	199.4	155.8	200.2	156.4	200.9	157.0	201.7	157.6	52
39	193 5	156.7	194.3	157.3	195.1	158.0	195.8	158.6	196.6	159.2	197.4	159.8	198.2	160.5	198.9	161.1	51
40	190.7	160.1	191.5	160.7	192.3	161.3	193.0	162.0	193.8	162.6	194.6	163.3	195.3	163.9	196.1	164.6	50
41	187.9	163.4	188.7	164.0	189.4	164.7	190.2	165.3	190.9	166.0	191.7	166.6	192.5	167.3	193.2	168.0	49
42	185.0	166.6	185.8	167.3	186.5	168.0	187.3	168.6	188.0	169.3	188.8	170.0	189.5	170.6	190.2	171.3	48
43	182.1	169.8	182.8	170.5	183.6	171.2	184.3	171.9	185.0	172.5	185.8	173.2	186.5	173.9	187.2	174.6	47
44	179.1	173.0	179.8	173.7	180.6	174.4	181.3	175.1	182.0	175.7	182.7	176.4	183.4	177.1	184.2	177.8	46
45	176.1	176.1	176.8	176.8	177.5	177.5	178.2	178.2	178.9	178.9	179.6	179.6	180.3	180.3	181.0	181.0	45
Cras.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Cras.

Traverse Table

Distance	257		258		259		260		261		262		263		264		
Cros Pts.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Cros. Pts.
¼	256.7	12.6	257.7	12.7	258.7	12.7	259.7	12.8	260.7	12.8	261.7	12.9	262.7	12.9	263.7	13.0	7¾
½	255.8	25.2	256.8	25.3	257.8	25.4	258.7	25.5	259.7	25.6	260.7	25.7	261.7	25.8	262.7	25.9	½
¾	254.2	37.7	255.2	37.9	256.2	38.0	257.2	38.1	258.2	38.3	259.2	38.4	260.1	38.6	261.1	38.7	¼
1	252.1	50.1	253.0	50.3	254.0	50.5	255.0	50.7	256.0	50.9	257.0	51.1	257.9	51.3	258.9	51.5	7
¼	249.3	62.5	250.3	62.7	251.2	62.9	252.2	63.2	253.2	63.4	254.2	63.7	255.1	63.9	256.1	64.2	¾
½	245.9	74.6	246.9	74.9	247.9	75.2	248.8	75.5	249.8	75.8	250.7	76.0	251.7	76.3	252.6	76.6	½
¾	242.0	86.6	242.9	86.9	243.9	87.2	244.8	87.6	245.7	87.9	246.7	88.3	247.6	88.6	248.6	88.9	¼
2	237.4	98.4	238.4	98.7	239.3	99.1	240.2	99.5	241.1	99.9	242.1	100.3	243.0	100.6	243.9	101.0	6
¼	232.3	109.9	233.2	110.3	234.1	110.7	235.0	111.2	235.9	111.6	236.8	112.0	237.7	112.5	238.7	112.9	¾
½	226.7	121.1	227.5	121.6	228.4	122.1	229.3	122.6	230.2	123.0	231.1	123.5	231.9	124.0	232.8	124.4	½
¾	220.4	132.1	221.3	132.6	222.1	133.1	223.0	133.7	223.9	134.2	224.7	134.7	225.6	135.2	226.4	135.7	¼
3	213.7	142.8	214.5	143.3	215.3	143.9	216.2	144.4	217.0	145.0	217.8	145.6	218.7	146.1	219.5	146.7	5
¼	206.4	153.1	207.2	153.7	208.0	154.3	208.8	154.9	209.6	155.5	210.4	156.1	211.2	156.7	212.0	157.3	¾
½	198.7	163.0	199.4	163.7	200.2	164.3	201.0	164.9	201.8	165.6	202.5	166.2	203.3	166.8	204.1	167.5	½
¾	190.4	172.6	191.2	173.2	191.9	173.9	192.6	174.6	193.4	175.3	194.1	175.9	194.9	176.6	195.6	177.3	¼
4	181.7	181.7	182.4	182.4	183.1	183.1	183.8	183.8	184.6	184.6	185.3	185.3	186.0	186.0	186.7	186.7	4
1°	257.0	04.5	258.0	04.5	259.0	04.5	260.0	04.5	261.0	04.6	262.0	04.6	263.0	04.6	264.0	04.6	89°
2	256.8	09.0	257.8	09.0	258.8	09.0	259.8	09.1	260.8	09.1	261.8	09.1	262.8	09.2	263.8	09.2	88
3	256.6	13.5	257.6	13.5	258.6	13.6	259.6	13.6	260.6	13.7	261.6	13.7	262.6	13.8	263.6	13.8	87
4	256.4	17.9	257.4	18.0	258.4	18.1	259.4	18.1	260.4	18.2	261.4	18.3	262.4	18.3	263.4	18.4	86
5	256.0	22.4	257.0	22.5	258.0	22.6	259.0	22.7	260.0	22.7	261.0	22.8	262.0	22.9	263.0	23.0	85
6	255.6	26.9	256.6	27.0	257.6	27.1	258.6	27.2	259.6	27.3	260.6	27.4	261.6	27.5	262.6	27.6	84
7	255.1	31.3	256.1	31.4	257.1	31.6	258.1	31.7	259.1	31.8	260.0	31.9	261.0	32.1	262.0	32.2	83
8	254.5	35.8	255.5	35.9	256.5	36.0	257.5	36.2	258.5	36.3	259.5	36.5	260.4	36.6	261.4	36.7	82
9	253.8	40.2	254.8	40.4	255.8	40.5	256.8	40.7	257.8	40.8	258.8	41.0	259.8	41.1	260.7	41.3	81
10	253.1	44.6	254.1	44.8	255.1	45.0	256.1	45.1	257.0	45.3	258.0	45.5	259.0	45.7	260.0	45.8	80
11	252.3	49.0	253.3	49.2	254.2	49.4	255.2	49.6	256.2	49.8	257.2	50.0	258.2	50.2	259.1	50.4	79
12	251.4	53.4	252.4	53.6	253.3	53.8	254.3	54.1	255.3	54.3	256.3	54.5	257.3	54.7	258.2	54.9	78
13	250.4	57.8	251.4	58.0	252.4	58.3	253.3	58.5	254.3	58.7	255.3	58.9	256.3	59.2	257.2	59.4	77
14	249.4	62.2	250.3	62.4	251.3	62.7	252.3	62.9	253.2	63.1	254.2	63.4	255.2	63.6	256.2	63.9	76
15	248.2	66.5	249.2	66.8	250.2	67.0	251.1	67.3	252.1	67.6	253.1	67.8	254.0	68.1	255.0	68.3	75
16	247.0	70.8	248.0	71.1	249.0	71.4	249.9	71.7	250.9	71.9	251.9	72.2	252.8	72.5	253.8	72.8	74
17	245.8	75.1	246.7	75.4	247.7	75.7	248.6	76.0	249.6	76.3	250.6	76.6	251.5	76.9	252.5	77.2	73
18	244.4	79.4	245.4	79.7	246.3	80.0	247.3	80.3	248.2	80.7	249.2	81.0	250.1	81.3	251.1	81.6	72
19	243.0	83.7	243.9	84.0	244.9	84.3	245.8	84.6	246.8	85.0	247.7	85.3	248.7	85.6	249.6	86.0	71
20	241.5	87.9	242.4	88.2	243.4	88.6	244.3	88.9	245.3	89.3	246.2	89.6	247.1	90.0	248.1	90.3	70
21	239.9	92.1	240.9	92.5	241.8	92.8	242.7	93.2	243.7	93.5	244.6	93.9	245.5	94.3	246.5	94.6	69
22	238.3	96.3	239.2	96.6	240.1	97.0	241.1	97.4	242.0	97.8	242.9	98.1	243.8	98.5	244.8	98.9	68
23	236.6	100.4	237.5	100.8	238.4	101.2	239.3	101.6	240.3	102.0	241.2	102.4	242.1	102.8	243.0	103.2	67
24	234.8	104.5	235.7	104.9	236.6	105.3	237.5	105.8	238.4	106.2	239.3	106.6	240.3	107.0	241.2	107.4	66
25	232.9	108.6	233.8	109.0	234.7	109.5	235.6	109.9	236.5	110.3	237.5	110.7	238.4	111.1	239.3	111.6	65
26	231.0	112.7	231.9	113.1	232.8	113.5	233.7	114.0	234.6	114.4	235.5	114.9	236.4	115.3	237.3	115.7	64
27	229.0	116.7	229.9	117.1	230.8	117.6	231.7	118.0	232.6	118.5	233.4	118.9	234.3	119.4	235.2	119.9	63
28	226.9	120.7	227.8	121.1	228.7	121.6	229.6	122.1	230.4	122.5	231.3	123.0	232.2	123.5	233.1	123.9	62
29	224.8	124.6	225.7	125.1	226.5	125.6	227.4	126.1	228.3	126.5	229.2	127.0	230.0	127.5	230.9	128.0	61
30	222.6	128.5	223.4	129.0	224.3	129.5	225.2	130.0	226.0	130.5	226.9	131.0	227.8	131.5	228.6	132.0	60
31	220.3	132.4	221.1	132.9	222.0	133.4	222.9	133.9	223.7	134.4	224.6	134.9	225.4	135.5	226.3	136.0	59
32	217.9	136.2	218.8	136.7	219.6	137.2	220.5	137.8	221.3	138.3	222.2	138.8	223.0	139.4	223.9	139.9	58
33	215.5	140.0	216.4	140.5	217.2	141.1	218.1	141.6	218.9	142.2	219.7	142.7	220.6	143.2	221.4	143.8	57
34	213.1	143.7	213.9	144.3	214.7	144.8	215.5	145.4	216.4	145.9	217.2	146.5	218.0	147.1	218.9	147.6	56
35	210.5	147.4	211.3	148.0	212.2	148.6	213.0	149.1	213.8	149.7	214.6	150.3	215.4	150.9	216.3	151.4	55
36	207.9	151.1	208.7	151.6	209.5	152.2	210.3	152.8	211.2	153.4	212.0	154.0	212.8	154.6	213.6	155.2	54
37	205.2	154.7	206.0	155.3	206.8	155.9	207.6	156.5	208.4	157.1	209.2	157.7	210.0	158.3	210.8	158.9	53
38	202.5	158.2	203.3	158.8	204.1	159.5	204.9	160.1	205.7	160.7	206.5	161.3	207.2	161.9	208.0	162.5	52
39	199.7	161.7	200.5	162.4	201.3	163.0	202.1	163.6	202.8	164.3	203.6	164.9	204.4	165.5	205.2	166.1	51
40	196.9	165.2	197.6	165.8	198.4	166.5	199.2	167.1	199.9	167.8	200.7	168.4	201.5	169.1	202.2	169.7	50
41	194.0	168.6	194.7	169.3	195.5	169.9	196.2	170.6	197.0	171.2	197.7	171.9	198.5	172.5	199.2	173.2	49
42	191.0	172.0	191.7	172.6	192.5	173.3	193.2	174.0	194.0	174.6	194.7	175.3	195.4	176.0	196.2	176.7	48
43	188.0	175.3	188.7	176.0	189.4	176.6	190.2	177.3	190.9	178.0	191.6	178.7	192.3	179.4	193.1	180.0	47
44	184.9	178.5	185.6	179.2	186.3	179.9	187.0	180.6	187.7	181.3	188.5	182.0	189.2	182.7	189.9	183.4	46
45	181.7	181.7	182.4	182.4	183.1	183.1	183.8	183.8	184.6	184.6	185.3	185.3	186.0	186.0	186.7	186.7	45
Cros.	Dep.	Diff.Lat.	Dep	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat	Dep.	Diff.Lat.	Dep	Diff.Lat.	Cros.

Traverse Table.

Dist.	265		266		267		268		269		270		271		272		
Course	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Course
Pts.																	Pts.
¼	264.7	13.0	265.7	13.1	266.7	13.1	267.7	13.2	268.7	13.2	269.7	13.3	270.7	13.3	271.7	13.3	7¼
½	263.7	26.0	264.7	26.1	265.7	26.2	266.7	26.3	267.7	26.4	268.7	26.5	269.7	26.6	270.7	26.7	½
¾	262.1	38.9	263.1	39.0	264.1	39.2	265.1	39.3	266.1	39.5	267.1	39.6	268.1	39.8	269.0	39.9	¾
1	259.9	51.7	260.9	51.9	261.9	52.1	262.8	52.3	263.8	52.5	264.8	52.7	265.8	52.9	266.8	53.1	7
¼	257.1	64.4	258.0	64.6	259.0	64.9	260.0	65.1	260.9	65.4	261.9	65.6	262.9	65.9	263.9	66.1	¼
½	253.6	76.9	254.6	77.2	255.5	77.5	256.5	77.8	257.4	78.1	258.4	78.4	259.3	78.7	260.3	79.0	½
¾	249.5	89.3	250.4	89.6	251.4	89.9	252.3	90.3	253.3	90.6	254.2	91.0	255.2	91.3	256.1	91.6	¾
2	244.8	101.4	245.8	101.8	246.7	102.2	247.6	102.6	248.5	102.9	249.5	103.3	250.4	103.7	251.3	104.1	6
¼	239.6	113.3	240.5	113.7	241.4	114.2	242.3	114.6	243.2	115.0	244.1	115.4	245.0	115.9	245.9	116.3	¼
½	233.7	124.9	234.6	125.4	235.5	125.9	236.4	126.3	237.2	126.8	238.1	127.3	239.0	127.7	239.9	128.2	½
¾	227.3	136.2	228.2	136.7	229.0	137.3	229.9	137.8	230.7	138.3	231.6	138.8	232.4	139.3	233.3	139.8	¾
3	220.3	147.2	221.2	147.8	222.0	148.3	222.8	148.9	223.7	149.4	224.5	150.0	225.3	150.6	226.2	151.1	5
¼	212.8	157.9	213.6	158.5	214.5	159.1	215.3	159.6	216.1	160.2	216.9	160.8	217.7	161.4	218.5	162.0	¼
½	204.8	168.1	205.6	168.7	206.4	169.4	207.2	170.0	207.9	170.6	208.7	171.3	209.5	171.9	210.3	172.6	½
¾	196.3	178.0	197.1	178.6	197.8	179.3	198.6	180.0	199.3	180.6	200.1	181.3	200.8	182.0	201.5	182.7	¾
4	187.4	187.4	188.1	188.1	188.8	188.8	189.5	189.5	190.2	190.2	190.9	190.9	191.6	191.6	192.3	192.3	4
1°	265.0	04.6	266.0	04.6	267.0	04.7	268.0	04.7	269.0	04.7	270.0	04.7	271.0	04.7	272.0	04.7	89°
2	264.8	09.2	265.8	09.3	266.8	09.3	267.8	09.4	268.8	09.4	269.8	09.4	270.8	09.5	271.8	09.5	88
3	264.6	13.9	265.6	13.9	266.6	14.0	267.6	14.0	268.6	14.1	269.6	14.1	270.6	14.2	271.6	14.2	87
4	264.4	18.5	265.4	18.6	266.3	18.6	267.3	18.7	268.3	18.8	269.3	18.8	270.3	18.9	271.3	19.0	86
5	264.0	23.1	265.0	23.2	266.0	23.3	267.0	23.4	268.0	23.4	269.0	23.5	270.0	23.6	271.0	23.7	85
6	263.5	27.7	264.5	27.8	265.5	27.9	266.5	28.0	267.5	28.1	268.5	28.2	269.5	28.3	270.5	28.4	84
7	263.0	32.3	264.0	32.4	265.0	32.5	266.0	32.7	267.0	32.8	268.0	32.9	269.0	33.0	270.0	33.1	83
8	262.4	36.9	263.4	37.0	264.4	37.2	265.4	37.3	266.4	37.4	267.4	37.6	268.4	37.7	269.4	37.9	82
9	261.7	41.5	262.7	41.6	263.7	41.8	264.7	41.9	265.7	42.1	266.7	42.2	267.7	42.4	268.7	42.6	81
10	261.0	46.0	262.0	46.2	262.9	46.4	263.9	46.5	264.9	46.7	265.9	46.9	266.9	47.1	267.9	47.2	80
11	260.1	50.6	261.1	50.9	262.1	50.9	263.1	51.1	264.1	51.3	265.0	51.5	266.0	51.7	267.0	51.9	79
12	259.2	55.1	260.2	55.3	261.2	55.5	262.1	55.7	263.1	55.9	264.1	56.1	265.1	56.3	266.1	56.6	78
13	258.2	59.6	259.2	59.8	260.2	60.1	261.1	60.3	262.1	60.5	263.1	60.7	264.1	61.0	265.0	61.2	77
14	257.1	64.1	258.1	64.4	259.1	64.6	260.0	64.8	261.0	65.1	262.0	65.3	263.0	65.6	263.9	65.8	76
15	256.0	68.6	256.9	68.8	257.9	69.1	258.9	69.4	259.8	69.6	260.8	69.9	261.8	70.1	262.7	70.4	75
16	254.7	73.0	255.7	73.2	256.7	73.6	257.6	73.9	258.6	74.1	259.5	74.3	260.5	74.7	261.5	75.0	74
17	253.4	77.5	254.4	77.8	255.3	78.1	256.3	78.4	257.2	78.6	258.2	78.9	259.2	79.2	260.1	79.5	73
18	252.0	81.9	253.0	82.2	253.9	82.5	254.9	82.8	255.8	83.1	256.8	83.4	257.7	83.7	258.7	84.1	72
19	250.6	86.3	251.5	86.6	252.5	86.9	253.4	87.3	254.3	87.6	255.3	87.9	256.2	88.2	257.2	88.6	71
20	249.0	90.6	250.0	91.0	250.9	91.3	251.8	91.7	252.8	92.0	253.7	92.3	254.7	92.7	255.6	93.0	70
21	247.4	95.0	248.3	95.3	249.3	95.7	250.2	96.0	251.1	96.4	252.1	96.8	253.0	97.1	253.9	97.5	69
22	245.7	99.3	246.6	99.6	247.6	100.0	248.5	100.4	249.4	100.8	250.3	101.1	251.3	101.5	252.2	101.9	68
23	243.9	103.5	244.9	103.9	245.8	104.3	246.7	104.7	247.6	105.1	248.5	105.5	249.5	105.9	250.4	106.3	67
24	242.1	107.8	243.0	108.2	243.9	108.6	244.8	109.0	245.7	109.4	246.7	109.8	247.6	110.2	248.5	110.6	66
25	240.2	112.0	241.1	112.4	242.0	112.8	242.9	113.3	243.8	113.7	244.7	114.1	245.6	114.5	246.5	115.0	65
26	238.2	116.2	239.1	116.6	240.0	117.0	240.9	117.5	241.8	117.9	242.7	118.4	243.6	118.8	244.5	119.2	64
27	236.1	120.3	237.0	120.8	237.9	121.2	238.8	121.7	239.7	122.1	240.6	122.6	241.5	123.0	242.4	123.5	63
28	234.0	124.4	234.9	124.9	235.7	125.3	236.6	125.8	237.5	126.3	238.4	126.8	239.3	127.2	240.2	127.7	62
29	231.8	128.5	232.6	129.0	233.5	129.4	234.4	129.9	235.3	130.4	236.1	130.9	237.0	131.4	237.9	131.9	61
30	229.5	132.5	230.4	133.0	231.2	133.5	232.1	134.0	233.0	134.5	233.8	135.0	234.7	135.5	235.6	136.0	60
31	227.1	136.5	228.0	137.0	228.9	137.5	229.7	138.0	230.6	138.5	231.4	139.1	232.3	139.6	233.1	140.1	59
32	224.7	140.4	225.6	141.0	226.4	141.5	227.3	142.0	228.1	142.5	229.0	143.1	229.8	143.6	230.7	144.1	58
33	222.2	144.3	223.1	144.9	223.9	145.4	224.8	146.0	225.6	146.5	226.4	147.1	227.3	147.6	228.1	148.1	57
34	219.7	148.2	220.5	148.7	221.4	149.3	222.2	149.9	223.0	150.4	223.8	151.0	224.7	151.5	225.5	152.1	56
35	217.1	152.0	217.9	152.6	218.7	153.1	219.5	153.7	220.4	154.3	221.2	154.9	222.0	155.4	222.8	156.0	55
36	214.4	155.8	215.2	156.4	216.0	156.9	216.8	157.5	217.6	158.1	218.4	158.7	219.2	159.3	220.1	159.9	54
37	211.6	159.5	212.4	160.1	213.2	160.7	214.0	161.3	214.8	161.9	215.6	162.5	216.4	163.1	217.2	163.7	53
38	208.8	163.2	209.6	163.8	210.4	164.4	211.2	165.0	212.0	165.6	212.8	166.2	213.6	166.8	214.3	167.5	52
39	205.9	166.8	206.7	167.4	207.5	168.0	208.3	168.7	209.1	169.3	209.8	169.9	210.6	170.5	211.4	171.2	51
40	203.0	170.3	203.8	171.0	204.5	171.6	205.3	172.3	206.1	172.9	206.8	173.6	207.6	174.2	208.4	174.8	50
41	200.0	173.9	200.8	174.5	201.5	175.2	202.3	175.8	203.0	176.5	203.8	177.1	204.5	177.8	205.3	178.4	49
42	196.9	177.3	197.7	178.0	198.4	178.7	199.2	179.3	199.9	180.0	200.6	180.7	201.4	181.3	202.1	182.0	48
43	193.8	180.7	194.5	181.4	195.3	182.1	196.0	182.8	196.7	183.5	197.5	184.1	198.2	184.8	198.9	185.5	47
44	190.6	184.1	191.3	184.8	192.1	185.5	192.8	186.2	193.5	186.9	194.2	187.6	194.9	188.3	195.7	188.9	46
45	187.4	187.4	188.1	188.1	188.8	188.8	189.5	189.5	190.2	190.2	190.9	190.9	191.6	191.6	192.3	192.3	45
Course	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Course

Traverse Table.

Distance.	273		274		275		276		277		278		279		280		
Cnse. Pts.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Cnse. Pts.
¼	272.7	13.4	273.7	13.4	274.7	13.5	275.7	13.5	276.7	13.6	277.7	13.6	278.7	13.7	279.7	13.7	¾
½	271.7	26.8	272.7	26.9	273.7	27.0	274.7	27.1	275.7	27.2	276.7	27.3	277.7	27.3	278.7	27.4	½
¾	270.0	40.1	271.0	40.2	272.0	40.3	273.0	40.5	274.0	40.6	275.0	40.8	276.0	40.9	277.0	41.1	¼
1	267.8	53.3	268.7	53.5	269.7	53.6	270.7	53.8	271.7	54.0	272.7	54.2	273.6	54.4	274.6	54.6	7
¼	264.8	66.3	265.8	66.6	266.8	66.8	267.7	67.1	268.7	67.3	269.7	67.6	270.6	67.8	271.6	68.0	¾
½	261.2	79.2	262.2	79.5	263.2	79.8	264.1	80.1	265.1	80.4	266.0	80.7	267.0	81.0	267.9	81.3	½
¾	257.0	92.0	258.0	92.3	258.9	92.6	259.9	93.0	260.8	93.3	261.7	93.7	262.7	94.0	263.6	94.3	¼
2	252.2	104.5	253.1	104.9	254.1	105.2	255.0	105.6	255.9	106.0	256.8	106.4	257.8	106.8	258.7	107.2	6
¼	246.8	116.7	247.7	117.2	248.6	117.6	249.5	118.0	250.4	118.4	251.3	118.9	252.2	119.3	253.1	119.7	¾
½	240.8	128.7	241.7	129.2	242.5	129.6	243.4	130.1	244.3	130.6	245.2	131.0	246.1	131.5	246.9	132.0	½
¾	234 2	140.3	235.0	140.9	235.9	141.4	236.7	141.9	237.6	142.4	238.4	142.9	239.3	143.4	240.2	143.9	¼
3	227.0	151.7	227.8	152.2	228.6	152.8	229.5	153.3	230.3	153.9	231.1	154.4	232.0	155.0	232.8	155.6	5
¼	219.3	162.6	220.1	163.2	220.9	163.8	221.7	164.4	222.5	165.0	223.3	165.6	224.1	166.2	224.9	166.8	¾
½	211.0	173.2	211.8	173.8	212.6	174.5	213.3	175.1	214.1	175.7	214.9	176.4	215.7	177.0	216.4	177.6	½
¾	202.3	183.3	203.0	184.0	203.8	184.7	204.5	185.3	205.2	186.0	206.0	186.7	206.7	187.4	207.5	188.0	¼
4	193.0	193.0	193.7	193.7	194.5	194.5	195.2	195.2	195.9	195.9	196.6	196.6	197.3	197.3	198.0	198.0	4
1°	273.0	04.8	274.0	04.8	275.0	04.8	276.0	04.8	277.0	04.8	278.0	04.9	279.0	04.9	280.0	04.9	89°
2	272.8	09.5	273.8	09.6	274.8	09.6	275.8	09.6	276.8	09.7	277.8	09.7	278.8	09.7	279.8	09.8	88
3	272.6	14.3	273.6	14.3	274.6	14.4	275.6	14.4	276.6	14.5	277.6	14.5	278.6	14.6	279.6	14.7	87
4	272.3	19.0	273.3	19.1	274.3	19.2	275.3	19.3	276.3	19.3	277.3	19.4	278.3	19.5	279.3	19.5	86
5	272.0	23.8	273.0	23.9	274.0	24.0	274.9	24.1	275.9	24.1	276.9	24.2	277.9	24.3	278.9	24.4	85
6	271.5	28.5	272.5	28.6	273.5	28.7	274.5	28.8	275.5	29.0	276.5	29.1	277.5	29.2	278.5	29.3	84
7	271.0	33.3	272.0	33.4	273.0	33.5	273.9	33.6	274.9	33.8	275.9	33.9	276.9	34.0	277.9	34.1	83
8	270.3	38.0	271.3	38.1	272.3	38.3	273.3	38.4	274.3	38.6	275.3	38.7	276.3	38.8	277.3	39.0	82
9	269.6	42.7	270.6	42.9	271.6	43 0	272.6	43.2	273.6	43.3	274.6	43.5	275.6	43.6	276.6	43.8	81
10	268.9	47.4	269.8	47.6	270.8	47.8	271.8	47.9	272.8	48.1	273.8	48.3	274.8	48.4	275.7	48.6	80
11	268.0	52.1	269.0	52.3	269.9	52.5	270.9	52.7	271.9	52.9	272.9	53.0	273.9	53.2	274.9	53.4	79
12	267.0	56.8	268.0	57.0	269.0	57.2	270.0	57.4	270.9	57.6	271.9	57.8	272.9	58.0	273.9	58.2	78
13	266.0	61.4	267.0	61.6	268.0	61.9	268.9	62.1	266.9	62.3	270.9	62.5	271.8	62.8	272.8	63.0	77
14	264.9	66.0	265.9	66.3	266.8	66.5	267.8	66.8	268.8	67.0	269.7	67.3	270.7	67.5	271.7	67.7	76
15	263.7	70.7	264.7	70.9	265.6	71.2	266.6	71.4	267.6	71.7	268.5	72.0	269.5	72.2	270.5	72.5	75
16	262.4	75.2	263.4	75.5	264.3	75.8	265.3	76.1	266.3	76.4	267.2	76.6	268.2	76.9	269.2	77.2	74
17	261.1	79.8	262.0	80.1	263.0	80.4	263.9	80.7	264.9	81.0	265.9	81.3	266.8	81.6	267.8	81.9	73
18	259.6	84.4	260.6	84.7	261.5	85.0	262.5	85.3	263.4	85.6	264.4	85.9	265.3	86.2	266.3	86.5	72
19	258.1	88.9	259.1	89.2	260.0	89.5	261.0	89.9	261.9	90.2	262.9	90.5	263.8	90.8	264.7	91.2	71
20	256.5	93.4	257.5	93.7	258.4	94.1	259.4	94.4	260.3	94.7	261.2	95.1	262.2	95.4	263.1	95.8	70
21	254.9	97.8	255.8	98.2	256.7	98.6	257.7	98.9	258.6	99.3	259.5	99.6	260.5	100.0	261.4	100.3	69
22	253.1	102.3	254.0	102.6	255.0	103.0	255.9	103.4	256.8	103.8	257.8	104.1	258.7	104.5	259.6	104.9	68
23	251.3	106.7	252.2	107.1	253.1	107.5	254.1	107.8	255.0	108.2	255.9	108.6	256.8	109.0	257.7	109.4	67
24	249.4	111.0	250.3	111.4	251.2	111.9	252.1	112.3	253.1	112.7	254.0	113.1	254.9	113.5	255.8	113.9	66
25	247.4	115.4	248.3	115.8	249.2	116.2	250.1	116.6	251.0	117.1	252.0	117.5	252.9	117.9	253.8	118.3	65
26	245.4	119.7	246.3	120.1	247.2	120.6	248.1	121.0	249.0	121.4	249.9	121.9	250.8	122.3	251.7	122.7	64
27	243.2	123.9	244.1	124.4	245.0	124.8	245.9	125.3	246.8	125.8	247.7	126.2	248.6	126.7	249.5	127.1	63
28	241.0	128.2	241.9	128.6	242.8	129.1	243.7	129.6	244.6	130.0	245.5	130.5	246.3	131.0	247.2	131.5	62
29	238.8	132.4	239.6	132.8	240.5	133.3	241.4	133.8	242.3	134.3	243.1	134.8	244.0	135.3	244.9	135.7	61
30	236.4	136.5	237.3	137.0	238.2	137.5	239.0	138.0	239.9	138.5	240.8	139.0	241.6	139.5	242.5	140.0	60
31	234.0	140.6	234.9	141.1	235.7	141.6	236.6	142.2	237.4	142.7	238.3	143.2	239.1	143.7	240.0	144.2	59
32	231.5	144.7	232.4	145.2	233.2	145.7	234.1	146.3	234.9	146.8	235.8	147.3	236.6	147.8	237.5	148.4	58
33	229.0	148.7	229.8	149.2	230.6	149.8	231.5	150.3	232.3	150.9	233.2	151.4	234.0	152.0	234.8	152.5	57
34	226.3	152.7	227.2	153.2	228.0	153.8	228.8	154.3	229.6	154.9	230.5	155.5	231.3	156.0	232.1	156.6	56
35	223.6	156.6	224.4	157.2	225.3	157.7	226.1	158.3	226.9	158.9	227.7	159.5	228.5	160.0	229.4	160.6	55
36	220.9	160.5	221.7	161.1	222.5	161.6	223.3	162.2	224.1	162.8	224.9	163.4	225.7	164.0	226.5	164.6	54
37	218.0	164.3	218.8	164.9	219.6	165.5	220.4	166.1	221.2	166.7	222.0	167.3	222.8	167.9	223.6	168.5	53
38	215.1	168.1	215.9	168.7	216.7	169.3	217.5	169.9	218.3	170.5	219.1	171.2	219.9	171.8	220.6	172.4	52
39	212.2	171.8	212.9	172.4	213.7	173.1	214.5	173.7	215.3	174.3	216.0	175.0	216.8	175.6	217.6	176.2	51
40	209.1	175.5	209.9	176.1	210.7	176.8	211.4	177.4	212.2	178.1	213.0	178.7	213.7	179.3	214.5	180.0	50
41	206.0	179.1	206.8	179.8	207.5	180.4	208.3	181.1	209.1	181.7	209.8	182.4	210.6	183.0	211.3	183.7	49
42	202.9	182.7	203.6	183.3	204.4	184.0	205.1	184.7	205.9	185.3	206.6	186.0	207.3	186.7	208.1	187.4	48
43	199.7	186.2	200.4	186.9	201.1	187.5	201.9	188.2	202.6	188.9	203.3	189.6	204.0	190.3	204.8	191.0	47
44	196.4	189.6	197.1	190.3	197.8	191.0	198.5	191.7	199.3	192.4	200.0	193.1	200.7	193.8	201.4	194.5	46
45	193.0	193.0	193.7	193.7	194.5	194.5	195.2	195.2	195 9	195.9	196.6	196.6	197.3	197.3	198.0	198.0	45
Cnse	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Cnse

Traverse Table.

Dist.	281		282		283		284		285		286		287		288	
Min.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep
¼	280.7	13.8	281.7	13.8	282.7	13.9	283.7	13.9	284.7	14.0	285.7	14.0	286.7	14.1	287.7	14
½	279.6	27.5	280.6	27.6	281.6	27.7	282.6	27.8	283.6	27.9	284.6	28.0	285.6	28.1	286.6	28
¾	278.0	41.2	278.9	41.4	279.9	41.5	280.9	41.7	281.9	41.8	282.9	42.0	283.9	42.1	284.9	42
1	275.6	54.8	276.6	55.0	277.6	55.2	278.5	55.4	279.5	55.6	280.5	55.8	281.5	56.0	282.5	56
¼	272.6	68.3	273.6	68.5	274.5	68.8	275.5	69.0	276.5	69.3	277.4	69.5	278.4	69.7	279.4	70
½	268.9	81.6	269.9	81.9	270.8	82.1	271.8	82.4	272.7	82.7	273.7	83.0	274.6	83.3	275.6	83
¾	264.5	94.7	265.5	95.0	266.5	95.3	267.4	95.7	268.3	96.0	269.3	96.3	270.2	96.7	271.2	97
2	259.6	107.5	260.5	107.9	261.5	108.3	262.4	108.7	263.3	109.1	264.2	109.5	265.2	109.8	266.1	110
¼	254.0	120.2	254.9	120.6	255.8	121.0	256.7	121.4	257.6	121.9	258.5	122.3	259.4	122.7	260.3	123
½	247.8	132.5	248.7	132.9	249.6	133.4	250.5	133.9	251.4	134.3	252.2	134.8	253.1	135.3	254.0	135
¾	241.0	144.5	241.9	145.0	242.7	145.5	243.6	146.0	244.4	146.5	245.3	147.0	246.2	147.5	247.0	148
3	233.6	156.1	234.5	156.7	235.3	157.2	236.1	157.8	237.0	158.3	237.8	158.9	238.6	159.4	239.5	160
¼	225.7	167.4	226.5	168.0	227.3	168.6	228.1	169.2	228.9	169.8	229.7	170.4	230.5	171.0	231.3	171
½	217.2	178.3	218.0	178.9	218.8	179.5	219.5	180.2	220.3	180.8	221.1	181.4	221.8	182.1	222.6	182
¾	208.2	188.7	208.9	189.4	209.7	190.0	210.4	190.7	211.2	191.4	211.9	192.1	212.6	192.7	213.4	193
4	198.7	198.7	199.4	199.4	200.1	200.1	200.8	200.8	201.5	201.5	202.2	202.2	202.9	202.9	203.6	203
1°	281.0	04.9	282.0	04.9	283.0	04.9	284.0	05.0	285.0	05.0	286.0	05.0	287.0	05.0	288.0	05
2	280.8	09.8	281.8	09.8	282.8	09.9	283.8	09.9	284.8	09.9	285.8	10.0	286.8	10.0	287.8	10
3	280.6	14.7	281.6	14.8	282.6	14.8	283.6	14.9	284.6	14.9	285.6	15.0	286.6	15.0	287.6	15
4	280.2	19.6	281.3	19.7	282.3	19.7	283.3	19.8	284.3	19.9	285.3	20.0	286.3	20.0	287.3	20
5	279.9	24.5	280.9	24.6	281.9	24.7	282.9	24.8	283.9	24.8	284.9	24.9	285.9	25.0	286.9	25
6	279.5	29.4	280.5	29.5	281.4	29.6	282.4	29.7	283.4	29.8	284.4	29.9	285.4	30.0	286.4	30
7	278.9	34.2	279.9	34.4	280.9	34.5	281.9	34.6	282.9	34.7	283.9	34.9	284.9	35.0	285.9	35
8	278.3	39.1	279.3	39.2	280.2	39.4	281.2	39.5	282.2	39.7	283.2	39.8	284.2	39.9	285.2	40
9	277.5	44.0	278.5	44.1	279.5	44.3	280.5	44.4	281.5	44.6	282.5	44.7	283.5	44.9	284.5	45
10	276.7	48.8	277.7	49.0	278.7	49.1	279.7	49.3	280.7	49.5	281.7	49.7	282.6	49.8	283.6	50
11	275.8	53.6	276.8	53.8	277.8	54.0	278.8	54.2	279.8	54.4	280.7	54.6	281.7	54.8	282.7	55
12	274.9	58.4	275.8	58.6	276.8	58.8	277.8	59.0	278.8	59.3	279.8	59.5	280.7	59.7	281.7	59
13	273.8	63.2	274.8	63.4	275.7	63.7	276.7	63.9	277.7	64.1	278.7	64.3	279.6	64.6	280.6	64
14	272.7	68.0	273.6	68.2	274.6	68.5	275.6	68.7	276.5	68.9	277.5	69.2	278.5	69.4	279.4	69
15	271.4	72.7	272.4	73.0	273.4	73.2	274.3	73.5	275.3	73.8	276.3	74.0	277.2	74.3	278.2	74
16	270.1	77.5	271.1	77.7	272.0	78.0	273.0	78.3	274.0	78.6	274.9	78.8	275.9	79.1	276.8	79
17	268.7	82.2	269.7	82.4	270.6	82.7	271.6	83.0	272.5	83.3	273.5	83.6	274.5	83.9	275.4	84
18	267.2	86.8	268.2	87.1	269.1	87.5	270.1	87.8	271.1	88.1	272.0	88.4	273.0	88.7	273.9	89
19	265.7	91.5	266.6	91.8	267.6	92.1	268.5	92.5	269.5	92.8	270.4	93.1	271.4	93.4	272.3	93
20	264.1	96.1	265.0	96.4	265.9	96.8	266.9	97.1	267.8	97.5	268.8	97.8	269.7	98.2	270.6	98
21	262.3	100.7	263.3	101.1	264.2	101.4	265.1	101.8	266.1	102.1	267.0	102.5	267.9	102.9	268.9	103
22	260.5	105.3	261.5	105.6	262.4	106.0	263.3	106.4	264.2	106.8	265.2	107.1	266.1	107.5	267.0	107
23	258.7	109.8	259.6	110.2	260.5	110.6	261.4	111.0	262.3	111.4	263.3	111.7	264.2	112.1	265.1	112
24	256.7	114.3	257.6	114.7	258.5	115.1	259.4	115.5	260.4	115.9	261.3	116.3	262.2	116.7	263.1	117
25	254.7	118.8	255.6	119.2	256.5	119.6	257.4	120.0	258.3	120.4	259.2	120.9	260.1	121.3	261.0	121
26	252.6	123.2	253.5	123.6	254.4	124.1	255.3	124.5	256.2	124.9	257.1	125.4	258.0	125.8	258.9	126
27	250.4	127.6	251.3	128.0	252.2	128.5	253.0	128.9	253.9	129.4	254.8	129.8	255.7	130.3	256.6	130
28	248.1	131.9	249.0	132.4	249.9	132.9	250.8	133.3	251.6	133.8	252.5	134.3	253.4	134.7	254.3	135
29	245.8	136.2	246.6	136.7	247.5	137.2	248.4	137.7	249.3	138.2	250.1	138.7	251.0	139.1	251.9	139
30	243.4	140.5	244.2	141.0	245.1	141.5	246.0	142.0	246.8	142.5	247.7	143.0	248.5	143.5	249.4	144
31	240.9	144.7	241.7	145.2	242.6	145.8	243.4	146.3	244.3	146.8	245.1	147.3	246.0	147.8	246.9	148
32	238.3	148.9	239.1	149.4	240.0	150.0	240.8	150.5	241.7	151.0	242.5	151.6	243.4	152.1	244.2	152
33	235.7	153.0	236.5	153.6	237.3	154.1	238.2	154.7	239.0	155.2	239.9	155.8	240.7	156.3	241.5	156
34	233.0	157.1	233.8	157.7	234.6	158.3	235.4	158.8	236.3	159.4	237.1	159.9	237.9	160.5	238.8	161
35	230.2	161.2	231.0	161.7	231.8	162.3	232.6	162.9	233.5	163.5	234.3	164.0	235.1	164.6	235.9	165
36	227.3	165.2	228.1	165.8	229.0	166.3	229.8	166.9	230.6	167.5	231.4	168.1	232.2	168.7	233.0	169
37	224.4	169.1	225.2	169.7	226.0	170.3	226.8	170.9	227.6	171.5	228.4	172.1	229.2	172.7	230.0	173
38	221.4	173.0	222.2	173.6	223.0	174.2	223.8	174.8	224.6	175.5	225.4	176.1	226.2	176.7	226.9	177
39	218.4	176.8	219.2	177.5	219.9	178.1	220.7	178.7	221.5	179.4	222.3	180.0	223.0	180.6	223.8	181
40	215.3	180.6	216.0	181.3	216.8	181.9	217.6	182.6	218.3	183.2	219.1	183.8	219.9	184.5	220.6	185
41	212.1	184.4	212.8	185.0	213.6	185.7	214.3	186.3	215.1	187.0	215.8	187.6	216.6	188.3	217.4	188
42	208.8	188.0	209.6	188.7	210.3	189.4	211.1	190.0	211.8	190.7	212.5	191.4	213.3	192.0	214.0	192
43	205.5	191.6	206.2	192.3	207.0	193.0	207.7	193.7	208.4	194.4	209.2	195.1	209.9	195.7	210.6	196
44	202.1	195.2	202.9	195.9	203.6	196.6	204.3	197.3	205.0	198.0	205.7	198.7	206.5	199.4	207.2	200
45	198.7	198.7	199.4	199.4	200.1	200.1	200.8	200.8	201.5	201.5	202.2	202.2	202.9	202.9	203.6	203
Dist.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. Lat.	Dep.	Diff. L

Traverse Table. (x.)

Distance.	289		290		291		292		293		294		295		296		
Crse. Pts.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Crse Pts.
¼	288.7	14.2	289.7	14.2	290.7	14.3	291.7	14.3	292.7	14.4	293.6	14.4	294.6	14.5	295.6	14.5	7¾
½	287.6	28.3	288.6	28.4	289.6	28.5	290.6	28.6	291.6	28.7	292.6	28.8	293.6	28.9	294.6	29.0	½
¾	285.9	42.4	286.9	42.5	287.8	42.7	288.8	42.8	289.8	43.0	290.8	43.1	291.8	43.3	292.8	43.4	¼
1	283.4	56.4	284.4	56.6	285.4	56.8	286.4	57.0	287.4	57.2	288.3	57.4	289.3	57.6	290.3	57.7	7
¼	280.3	70.2	281.3	70.5	282.3	70.7	283.3	71.0	284.2	71.2	285.2	71.4	286.2	71.7	287.1	71.9	¾
½	276.6	83.9	277.5	84.2	278.5	84.5	279.4	84.8	280.4	85.0	281.3	85.3	282.3	85.6	283.3	85.9	½
¾	272.1	97.4	273.0	97.7	274.0	98.0	274.9	98.4	275.9	98.7	276.8	99.0	277.7	99.4	278.7	99.7	¼
2	267.0	110.6	267.9	111.0	268.9	111.4	269.8	111.7	270.7	112.1	271.6	112.5	272.5	112.9	273.5	113.3	6
¼	261.3	123.6	262.2	124.0	263.1	124.4	264.0	124.9	264.9	125.3	265.8	125.7	266.7	126.1	267.6	126.6	¾
½	254.9	136.2	255.8	136.7	256.6	137.2	257.5	137.6	258.4	138.1	259.3	138.6	260.2	139.1	261.1	139.5	½
¾	247.9	148.6	248.7	149.1	249.6	149.6	250.5	150.1	251.3	150.6	252.2	151.1	253.0	151.7	253.9	152.2	¼
3	240.3	160.6	241.1	161.1	242.0	161.7	242.8	162.2	243.6	162.8	244.4	163.3	245.3	163.9	246.1	164.4	5
¼	232.1	172.2	232.9	172.8	233.7	173.3	234.5	173.9	235.3	174.5	236.1	175.1	236.9	175.7	237.7	176.3	¾
½	223.4	183.3	224.2	184.0	224.9	184.6	225.7	185.2	226.5	185.9	227.3	186.5	228.0	187.1	228.8	187.8	½
¾	214.1	194.1	214.9	194.7	215.6	195.4	216.4	196.1	217.1	196.8	217.8	197.4	218.6	198.1	219.3	198.8	¼
4	204.3	204.3	205.1	205.1	205.8	205.8	206.5	206.5	207.2	207.2	207.9	207.9	208.6	208.6	209.3	209.3	4
1°	289.0	05.0	290.0	05.1	291.0	05.1	292.0	05.1	293.0	05.1	294.0	05.1	295.0	05.1	296.0	05.2	89°
2	288.8	10.1	289.8	10.1	290.8	10 2	291.8	10.2	292.8	10.2	293.8	10.3	294.8	10.3	295.8	10.3	88
3	288.6	15.1	289.6	15.2	290.6	15.2	291.6	15.3	292.6	15.3	293.6	15.4	294.6	15.4	295.6	15.5	87
4	288.3	20.2	289.3	20.2	290.3	20.3	291.3	20.4	292.3	20.4	293.3	20.5	294.3	20.6	295.3	20.6	86
5	287.9	25.2	288.9	25.3	289.9	25.4	290.9	25.4	291.9	25.5	292.9	25.6	293.9	25.7	294.9	25.8	85
6	287.4	30.2	288.4	30.3	289.4	30.4	290.4	30.5	291.4	30.6	292.4	30.7	293.4	30.8	294.4	30.9	84
7	286.8	35.2	287.8	35.3	288.8	35.5	289.8	35.6	290.8	35.7	291.8	35.8	292.8	36.0	293.8	36.1	83
8	286.2	40.2	287.2	40.4	288.2	40.5	289.2	40.6	290.1	40.8	291.1	40.9	292.1	41.1	293.1	41.2	82
9	285.4	45.2	286.4	45.4	287.4	45.5	288.4	45.7	289.4	45.8	290.4	46.0	291.4	46.1	292.4	46.3	81
10	284.6	50.2	285.6	50.4	286.6	50.5	287.6	50.7	288.5	50.9	289.5	51.1	290.5	51.2	291.5	51.4	80
11	283.7	55.1	284.7	55.3	285.7	55.5	286.6	55.7	287.6	55.9	288.6	56.1	289.6	56.3	290.6	56.5	79
12	282.7	60.1	283.7	60.3	284.6	60.5	285.6	60.7	286.6	60.9	287.6	61.1	288.6	61.3	289.5	61.5	78
13	281.6	65.0	282.6	65.2	283.5	65.5	284.5	65.7	285.5	65.9	286.5	66.1	287.4	66.4	288.4	66.6	77
14	280.4	69.9	281.4	70.2	282.4	70.4	283.3	70.6	284.3	70.9	285.3	71.1	286.2	71.4	287.2	71.6	76
15	279.2	74.8	280.1	75.1	281.1	75.3	282.1	75.6	283.0	75.8	284.0	76.1	284.9	76.4	285.9	76.6	75
16	277.8	79.7	278.8	79.9	279.7	80.2	280.7	80.5	281.6	80.8	282.6	81.0	283.6	81.3	284.5	81.6	74
17	276.4	84.5	277.3	84 8	278.3	85.1	279.2	85.4	280.2	85.7	281.2	86.0	282.1	86.2	283.1	86.5	73
18	274.9	89.3	275.8	89.6	276.8	89.9	277.7	90.2	278.7	90 5	279.6	90.9	280.6	91.2	281.5	91.5	72
19	273.3	94.1	274.2	94.4	275.1	94.7	276.1	95.1	277.0	95 4	278.0	95.7	278.9	96.0	279.9	96.4	71
20	271.6	98.8	272.5	99.2	273.5	99.5	274.4	99.9	275.3	100.2	276.3	100.6	277.2	100.9	278.1	101.2	70
21	269.8	103.6	270.7	103.9	271.7	104.3	272.6	104.6	273.5	105.0	274.5	105.4	275.4	105.7	276.3	106.1	69
22	268.0	108.3	268 9	108.6	269.8	109.0	270.7	109.4	271.7	109.8	272.6	110.1	273.5	110.5	274.4	110.9	68
23	266.0	112.9	266.9	113.3	267.9	113.7	268.8	114.1	269.7	114.5	270.6	114.9	271.5	115.3	272.5	115.7	67
24	264.0	117.5	264.9	118.0	265.8	118.4	266.8	118.8	267.7	119.2	268.6	119.6	269.5	120.0	270.4	120.4	66
25	261.9	122.1	262.8	122.6	263.7	123.0	264.6	123.4	265.5	123.8	266.5	124.2	267.4	124.7	268.3	125.1	65
26	259.8	126.7	260.7	127.1	261.5	127.6	262.4	128.0	263.3	128.4	264.2	128.9	265.1	129.3	266.0	129.8	64
27	257.5	131.2	258.4	131.7	259.3	132.1	260.2	132 6	261.1	133.0	262.0	133.5	262.8	133.9	263.7	134.4	63
28	255.2	135.7	256.1	136.1	256.9	136.6	257.8	137.1	258.7	137.6	259.6	138.0	260.5	138.5	261.3	139.0	62
29	252.8	140.1	253.6	140.6	254.5	141.1	255.4	141.6	256.3	142.0	257.1	142.5	258.0	143.0	258.9	143.5	61
30	250.3	144.5	251.1	145.0	252.0	145.5	252.9	146.0	253.7	146.5	254.6	147.0	255.5	147.5	256.3	148.0	60
31	247.7	148.8	248.6	149.4	249.4	149.9	250.3	150.4	251.2	150.9	252.0	151.4	252.9	151.9	253.7	152.5	59
32	245.1	153.1	245.9	153.7	246.8	154.2	247.6	154.7	248.5	155.3	249.3	155.8	250.2	156.3	251.0	156.9	58
33	242.4	157.4	243.2	157.9	244.1	158.5	244.9	159.0	245.7	159.6	246.6	160.1	247.4	160.7	248.2	161.2	57
34	239.6	161.6	240.4	162.2	241.2	162.7	242.1	163.3	242.9	163.8	243.7	164.4	244.6	165.0	245.4	165.5	56
35	236 7	165.8	237.6	166.3	238.4	166.9	239.2	167.5	240.0	168.1	240.8	168.6	241.6	169.2	242.5	169.8	55
36	233.8	169.9	234.6	170.5	235.4	171.0	236.2	171.6	237.0	172.2	237.9	172.8	238.7	173.4	239.5	174.0	54
37	230.8	173.9	231.6	174.5	232.4	175.1	233.2	175.7	234.0	176.3	234.8	176.9	235.6	177.5	236.4	178.1	53
38	227.7	177.9	228.5	178.5	229.3	179.2	230.1	179.8	230.9	180.4	231.7	181.0	232.5	181.6	233.3	182.2	52
39	224.6	181.9	225.4	182.5	226.1	183.1	226.9	183.8	227.7	184.4	228.5	185.0	229.3	185.6	230.0	186.3	51
40	221.4	185.8	222.2	186.4	222.9	187.1	223.7	187.7	224.5	188.3	225.2	189.0	226.0	189.6	226.7	190.3	50
41	218.1	189.6	218.9	190.3	219.6	190.9	220.4	191.6	221.1	192.2	221.9	192.9	222.6	193.5	223.4	194.2	49
42	214.8	193.4	215 5	194.0	216.3	194.7	217.0	195.4	217.7	196.1	218.5	196.7	219.2	197.4	220.0	198.1	48
43	211.4	197.1	212.1	197.8	212.8	198.5	213.6	199.1	214.3	199.8	215.0	200.5	215.7	201.2	216.5	201.9	47
44	207.9	200.8	208.6	201.5	209 3	202.1	210.0	202.8	210.8	203.5	211.5	204.2	212.2	204.9	212.9	205.6	46
45	204.3	204.3	205.1	205.1	205.8	205.8	206.5	206.5	207.2	207.2	207.9	207.9	208.6	208.6	209.3	209.3	45
Crse.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep	Diff.Lat	Dep.	Diff.Lat.	Dep	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Dep.	Diff.Lat.	Crse.

Departure and Corresponding Difference of Longitude.

Lat.	*Departure.*										
	·5	1	2	3	4	5	6	7	8	9	10
4°	·50	1·002	2·00	3·01	4·01	5·01	6·01	7·02	8·02	9·02	10·02
8	·51	1·010	2·02	3·03	4·04	5·05	6·06	7·07	8·08	9·09	10·10
10	·51	1·016	2·03	3·05	4·06	5·08	6·09	7·11	8·11	9·14	10·15
12	·51	1·022	2·04	3·07	4·09	5·11	6·13	7·16	8·18	9·20	10·22
14	·52	1·031	2·06	3·09	4·12	5·15	6·18	7·21	8·24	9·28	10·31
15	·52	1·035	2·07	3·11	4·14	5·18	6·21	7·25	8·28	9·32	10·35
16	·52	1·040	2·08	3·12	4·16	5·20	6·24	7·28	8·32	9·36	10·40
17	·52	1·046	2·09	3·14	4·18	5·23	6·27	7·32	8·37	9·41	10·46
18	·53	1·051	2·10	3·15	4·21	5·26	6·31	7·36	8·41	9·46	10·51
19	·53	1·058	2·12	3·17	4·23	5·29	6·35	7·40	8·46	9·52	10·58
20	·53	1·064	2·13	3·19	4·26	5·32	6·39	7·45	8·51	9·58	10·64
21	·54	1·071	2·14	3·21	4·28	5·36	6·43	7·50	8·57	9·64	10·71
22	·54	1·079	2·16	3·24	4·31	5·39	6·47	7·55	8·63	9·71	10·79
23	·54	1·086	2·17	3·26	4·35	5·43	6·52	7·60	8·69	9·78	10·86
24	·55	1·095	2·19	3·28	4·38	5·47	6·57	7·66	8·76	9·85	10·95
25	·55	1·103	2·21	3·31	4·41	5·52	6·62	7·72	8·83	9·93	11·03
26	·56	1·113	2·23	3·34	4·45	5·56	6·68	7·79	8·90	10·01	11·13
27	·56	1·122	2·24	3·37	4·49	5·61	6·73	7·86	8·98	10·10	11·22
28	·57	1·133	2·27	3·40	4·53	5·66	6·80	7·93	9·06	10·19	11·33
29	·57	1·143	2·29	3·43	4·57	5·72	6·86	8·00	9·15	10·29	11·43
30	·58	1·155	2·31	3·46	4·62	5·77	6·93	8·08	9·24	10·39	11·55
31	·58	1·167	2·33	3·50	4·67	5·83	7·00	8·17	9·33	10·50	11·67
32	·59	1·179	2·36	3·54	4·72	5·90	7·08	8·25	9·43	10·61	11·79
33	·60	1·192	2·38	3·58	4·77	5·96	7·15	8·35	9·54	10·73	11·92
34	·60	1·206	2·41	3·62	4·82	6·03	7·24	8·44	9·65	10·86	12·06
35	·61	1·221	2·44	3·66	4·88	6·10	7·32	8·54	9·76	10·99	12·21
36	·62	1·236	2·47	3·71	4·94	6·18	7·42	8·65	9·89	11·12	12·36
37	·63	1·252	2·50	3·76	5·01	6·26	7·51	8·76	10·02	11·27	12·52
38	·63	1·269	2·54	3·81	5·08	6·35	7·61	8·88	10·15	11·42	12·69
39	·64	1·287	2·57	3·86	5·15	6·43	7·72	9·01	10·29	11·58	12·87
40	·65	1·305	2·61	3·92	5·22	6·53	7·83	9·14	10·44	11·75	13·05
41	·66	1·325	2·65	3·98	5·30	6·63	7·95	9·28	10·60	11·93	13·25
42	·67	1·346	2·69	4·04	5·38	6·73	8·07	9·42	10·77	12·11	13·46
43	·68	1·367	2·73	4·10	5·47	6·84	8·20	9·57	10·94	12·31	13·67
44	·70	1·390	2·78	4·17	5·56	6·95	8·34	9·73	11·12	12·51	13·90
45	·71	1·414	2·83	4·24	5·66	7·07	8·49	9·90	11·31	12·73	14·14
46	·72	1·440	2·88	4·32	5·76	7·20	8·64	10·08	11·52	12·96	14·40
47	·73	1·466	2·93	4·40	5·87	7·33	8·80	10·26	11·73	13·20	14·66
48	·75	1·494	2·99	4·48	5·98	7·47	8·97	10·46	11·96	13·45	14·94
49	·76	1·521	3·05	4·57	6·10	7·62	9·15	10·67	12·19	13·72	15·24
50	·79	1·556	3·11	4·67	6·22	7·78	9·33	10·89	12·45	14·00	15·56
51	·79	1·589	3·18	4·77	6·36	7·95	9·53	11·12	12·71	14·30	15·89
52	·81	1·624	3·25	4·87	6·50	8·12	9·75	11·37	12·99	14·62	16·24
53	·83	1·662	3·32	4·98	6·65	8·31	9·97	11·63	13·29	14·95	16·62
54	·85	1·701	3·40	5·10	6·81	8·51	10·21	11·91	13·61	15·31	17·01
55	·87	1·743	3·49	5·23	6·97	8·72	10·46	12·20	13·95	15·69	17·43
56	·89	1·788	3·58	5·36	7·15	8·94	10·73	12·52	14·31	16·09	17·88
57	·92	1·836	3·67	5·51	7·34	9·18	11·02	12·85	14·67	16·52	18·36
58	·94	1·887	3·77	5·66	7·55	9·44	11·32	13·21	15·10	16·98	18·87
59	·97	1·942	3·88	5·82	7·77	9·71	11·65	13·59	15·53	17·47	19·42
60	1	2	4	6	8	10	12	14	16	18	20
61	1·03	2·063	4·13	6·19	8·25	10·31	12·38	14·44	16·50	18·56	20·63
62	1·07	2·130	4·26	6·39	8·52	10·65	12·78	14·91	17·04	19·17	21·30
63	1·10	2·203	4·41	6·61	8·81	11·01	13·22	15·42	17·62	19·82	22·03
64	1·14	2·281	4·56	6·84	9·12	11·41	13·69	15·97	18·25	20·53	22·81
65	1·18	2·366	4·73	7·10	9·46	11·83	14·20	16·56	18·93	21·30	23·66
66	1·23	2·459	4·92	7·38	9·83	12·29	14·75	17·21	19·67	22·13	24·59
67	1·28	2·559	5·12	7·68	10·24	12·80	15·36	17·92	20·47	23·03	25·59
68	1·33	2·669	5·34	8·01	10·68	13·35	16·02	18·69	21·36	24·03	26·69
69	1·40	2·790	5·58	8·37	11·16	13·95	16·74	19·53	22·32	25·11	27·90
70	1·46	2·924	5·85	8·77	11·70	14·62	17·54	20·47	23·39	26·31	29·24

Converting Difference of Longitude into Departure.

Lat.	*Difference of Longitude.*										
	·5	1	2	3	4	5	6	7	8	9	10
4°	·50	·998	2·00	2·99	3·99	4·99	5·99	6·98	7·98	8·98	9·98
8	·50	·990	1·98	2·97	3·96	4·95	5·94	6·93	7·92	8·91	9·90
10	·49	·985	1·97	2·95	3·94	4·92	5·91	6·89	7·88	8·86	9·85
12	·49	·978	1·96	2·93	3·91	4·89	5·87	6·85	7·83	8·80	9·78
14	·49	·970	1·94	2·91	3·88	4·85	5·82	6·79	7·76	8·73	9·70
15	·48	·966	1·93	2·90	3·86	4·83	5·80	6·76	7·73	8·69	9·66
16	·48	·961	1·92	2·88	3·85	4·81	5·77	6·73	7·69	8·65	9·61
17	·48	·956	1·91	2·87	3·83	4·78	5·74	6·69	7·65	8·61	9·56
18	·48	·951	1·90	2·85	3·80	4·76	5·71	6·66	7·61	8·56	9·51
19	·47	·946	1·89	2·84	3·78	4·73	5·67	6·62	7·56	8·51	9·46
20	·47	·940	1·88	2·82	3·76	4·70	5·64	6·58	7·52	8·46	9·40
21	·47	·934	1·87	2·80	3·73	4·67	5·60	6·54	7·47	8·40	9·34
22	·46	·927	1·85	2·78	3·71	4·64	5·56	6·49	7·42	8·34	9·27
23	·46	·921	1·84	2·76	3·68	4·60	5·52	6·44	7·36	8·28	9·21
24	·46	·914	1·83	2·74	3·65	4·57	5·48	6·39	7·31	8·22	9·14
25	·45	·906	1·81	2·72	3·63	4·53	5·44	6·34	7·25	8·16	9·06
26	·45	·899	1·80	2·70	3·60	4·49	5·39	6·29	7·19	8·09	8·99
27	·45	·891	1·78	2·67	3·56	4·46	5·35	6·24	7·13	8·02	8·91
28	·44	·883	1·77	2·65	3·53	4·41	5·30	6·18	7·06	7·95	8·83
29	·44	·875	1·75	2·62	3·50	4·37	5·25	6·12	7·00	7·87	8·75
30	·43	·867	1·73	2·60	3·46	4·33	5·20	6·06	6·93	7·79	8·66
31	·43	·857	1·71	2·57	3·43	4·29	5·14	6·00	6·86	7·71	8·57
32	·42	·848	1·70	2·54	3·39	4·24	5·09	5·94	6·78	7·63	8·48
33	·42	·839	1·68	2·52	3·35	4·19	5·03	5·87	6·71	7·55	8·39
34	·41	·829	1·66	2·49	3·32	4·15	4·97	5·80	6·63	7·46	8·29
35	·41	·819	1·64	2·46	3·28	4·10	4·91	5·73	6·55	7·37	8·19
36	·40	·809	1·62	2·43	3·24	4·05	4·85	5·66	6·47	7·28	8·09
37	·40	·799	1·60	2·40	3·19	3·99	4·79	5·59	6·39	7·19	7·99
38	·39	·788	1·58	2·36	3·15	3·94	4·73	5·52	6·30	7·09	7·88
39	·39	·777	1·55	2·33	3·11	3·89	4·66	5·44	6·22	6·99	7·77
40	·38	·766	1·53	2·30	3·06	3·83	4·60	5·36	6·13	6·89	7·66
41	·38	·755	1·51	2·26	3·02	3·77	4·53	5·28	6·04	6·79	7·55
42	·37	·743	1·49	2·23	2·97	3·72	4·46	5·20	5·95	6·69	7·43
43	·37	·731	1·46	2·19	2·93	3·66	4·39	5·12	5·85	6·58	7·31
44	·36	·719	1·44	2·16	2·88	3·60	4·32	5·04	5·75	6·47	7·19
45	·35	·707	1·41	2·12	2·83	3·54	4·24	4·95	5·66	6·36	7·07
46	·35	·695	1·39	2·08	2·78	3·47	4·17	4·86	5·56	6·25	6·95
47	·34	·682	1·36	2·04	2·73	3·41	4·09	4·77	5·46	6·14	6·82
48	·33	·669	1·34	2·01	2·68	3·35	4·01	4·68	5·35	6·02	6·69
49	·33	·656	1·31	1·97	2·62	3·28	3·94	4·59	5·25	5·90	6·56
50	·32	·643	1·29	1·93	2·57	3·21	3·86	4·50	5·14	5·79	6·43
51	·31	·629	1·26	1·89	2·52	3·15	3·78	4·41	5·03	5·66	6·29
52	·31	·616	1·23	1·85	2·46	3·08	3·69	4·31	4·93	5·54	6·16
53	·30	·602	1·20	1·81	2·41	3·01	3·61	4·21	4·81	5·42	6·02
54	·29	·588	1·18	1·76	2·35	2·94	3·53	4·11	4·70	5·29	5·88
55	·29	·574	1·16	1·72	2·29	2·87	3·44	4·02	4·59	5·16	5·74
56	·28	·559	1·12	1·68	2·24	2·80	3·35	3·91	4·47	5·03	5·59
57	·27	·545	1·09	1·63	2·18	2·72	3·27	3·81	4·36	4·90	5·45
58	·26	·530	1·06	1·59	2·12	2·65	3·18	3·71	4·24	4·77	5·30
59	·26	·515	1·03	1·55	2·06	2·58	3·09	3·61	4·12	4·64	5·16
60	·25	·5	1	1·5	2	2·5	3	3·5	4	4·5	5
61	·24	·485	0·97	1·45	1·94	2·42	2·91	3·39	3·88	4·36	4·85
62	·23	·470	0·94	1·41	1·88	2·35	2·82	3·29	3·76	4·23	4·69
63	·23	·454	0·91	1·36	1·82	2·27	2·72	3·18	3·63	4·09	4·54
64	·22	·438	0·88	1·32	1·75	2·19	2·63	3·07	3·51	3·95	4·38
65	·21	·423	0·85	1·27	1·69	2·11	2·54	2·96	3·38	3·80	4·23
66	·20	·407	0·81	1·22	1·63	2·03	2·44	2·85	3·25	3·66	4·07
67	·20	·391	0·78	1·17	1·56	1·95	2·34	2·74	3·13	3·52	3·91
68	·19	·375	0·75	1·12	1·50	1·87	2·25	2·62	3·00	3·37	3·75
69	·18	·358	0·72	1·08	1·43	1·79	2·15	2·51	2·87	3·23	3·58
70	·17	·342	0·68	1·02	1·37	1·71	2·05	2·39	2·73	3·07	3·42

Table for Correcting Middle Latitude.

Mid. Lat.	Difference of Latitude.																		
	2°	3°	4°	5°	6°	7°	8°	9°	10°	11°	12°	13°	14°	15°	16°	17°	18°	19°	20°
°	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
15	0 0	0 2	0 3	0 4	0 6	0 9	0 12	0 15	0 19	0 23	0 27	0 31	0 35	0 40	0 45	0 51	0 58	1 6	1 14
17	0 0	0 2	0 3	0 4	0 6	0 8	0 11	0 14	0 17	0 21	0 25	0 28	0 32	0 37	0 42	0 48	0 54	1 1	1 8
19	0 0	0 2	0 3	0 4	0 6	0 8	0 10	0 13	0 16	0 19	0 23	0 26	0 30	0 35	0 39	0 45	0 50	0 56	1 3
21	0 0	0 2	0 3	0 4	0 6	0 7	0 9	0 12	0 15	0 18	0 21	0 25	0 29	0 33	0 37	0 42	0 47	0 53	0 58
23	0 0	0 2	0 3	0 4	0 6	0 7	0 9	0 12	0 15	0 17	0 20	0 24	0 28	0 32	0 36	0 40	0 45	0 50	0 55
25	0 0	0 2	0 3	0 4	0 5	0 7	0 9	0 11	0 14	0 16	0 19	0 23	0 27	0 31	0 35	0 39	0 43	0 47	0 52
27	0 0	0 2	0 3	0 4	0 5	0 7	0 8	0 11	0 14	0 16	0 19	0 22	0 26	0 30	0 33	0 38	0 42	0 46	0 51
29	0 0	0 2	0 3	0 4	0 5	0 6	0 8	0 10	0 13	0 15	0 18	0 22	0 25	0 29	0 32	0 37	0 41	0 45	0 50
31	0 0	0 2	0 3	0 4	0 5	0 6	0 8	0 10	0 13	0 15	0 18	0 21	0 25	0 28	0 32	0 36	0 41	0 45	0 50
33	0 0	0 2	0 3	0 4	0 5	0 6	0 8	0 10	0 13	0 15	0 18	0 21	0 24	0 27	0 31	0 35	0 40	0 44	0 49
35	0 0	0 2	0 3	0 4	0 5	0 6	0 8	0 10	0 13	0 15	0 18	0 21	0 24	0 27	0 31	0 35	0 40	0 44	0 49
37	0 0	0 2	0 3	0 4	0 5	0 6	0 8	0 10	0 13	0 15	0 18	0 21	0 24	0 27	0 31	0 35	0 40	0 44	0 49
39	0 0	0 2	0 3	0 4	0 5	0 6	0 8	0 10	0 13	0 15	0 18	0 22	0 25	0 28	0 32	0 36	0 41	0 45	0 50
41	0 0	0 2	0 3	0 4	0 5	0 6	0 8	0 10	0 13	0 15	0 18	0 22	0 25	0 29	0 33	0 37	0 41	0 45	0 50
43	0 0	0 2	0 3	0 4	0 5	0 7	0 9	0 11	0 14	0 16	0 19	0 23	0 26	0 30	0 34	0 38	0 42	0 46	0 51
45	0 1	0 2	0 3	0 4	0 5	0 7	0 9	0 11	0 14	0 16	0 19	0 23	0 27	0 31	0 35	0 39	0 43	0 47	0 52
47	0 1	0 2	0 3	0 4	0 5	0 7	0 9	0 11	0 14	0 16	0 20	0 23	0 27	0 31	0 35	0 40	0 44	0 49	0 54
49	0 1	0 2	0 3	0 4	0 5	0 7	0 9	0 11	0 14	0 17	0 21	0 24	0 28	0 32	0 36	0 41	0 45	0 51	0 57
51	0 1	0 2	0 3	0 4	0 5	0 7	0 9	0 12	0 15	0 17	0 21	0 24	0 28	0 32	0 37	0 42	0 47	0 53	0 59
53	0 1	0 2	0 3	0 4	0 6	0 7	0 9	0 12	0 15	0 18	0 22	0 25	0 29	0 33	0 38	0 43	0 49	0 55	1 1
55	0 1	0 2	0 3	0 4	0 6	0 8	0 10	0 13	0 16	0 19	0 23	0 26	0 30	0 35	0 40	0 45	0 51	0 57	1 3
57	0 1	0 2	0 3	0 4	0 6	0 8	0 10	0 14	0 17	0 20	0 24	0 28	0 32	0 37	0 42	0 48	0 54	1 0	1 6
59	0 1	0 2	0 3	0 4	0 6	0 8	0 11	0 15	0 18	0 22	0 26	0 30	0 34	0 39	0 45	0 51	0 57	1 4	1 10
61	0 1	0 2	0 3	0 5	0 7	0 9	0 12	0 15	0 19	0 23	0 27	0 31	0 36	0 41	0 48	0 54	1 1	1 8	1 15
63	0 1	0 2	0 4	0 5	0 7	0 9	0 13	0 16	0 20	0 24	0 29	0 33	0 39	0 44	0 51	0 58	1 5	1 12	1 21
65	0 1	0 2	0 4	0 6	0 8	0 10	0 14	0 17	0 21	0 25	0 30	0 35	0 42	0 48	0 55	1 2	1 9	1 18	1 27
67	0 1	0 2	0 4	0 6	0 8	0 11	0 15	0 18	0 23	0 27	0 33	0 38	0 45	0 53	1 0	1 7	1 16	1 25	1 34
69	0 1	0 2	0 5	0 6	0 9	0 12	0 16	0 20	0 25	0 30	0 36	0 42	0 50	0 58	1 5	1 14	1 23	1 34	1 44
71	0 1	0 3	0 6	0 7	0 9	0 13	0 18	0 22	0 27	0 33	0 40	0 46	0 55	1 3	1 12	1 22	1 32	1 44	1 57
72	0 1	0 3	0 6	0 8	0 10	0 14	0 19	0 23	0 29	0 35	0 42	0 49	0 58	1 6	1 16	1 27	1 38	1 50	2 4

Meridional Parts.

Lat.	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	
0′	0.00	60.00	120 02	180.08	240.19	300.38	360.66	421.05	481.57	542.23	603.07	0′
1	1.00	61.00	121.02	181.08	241.20	301.38	361.66	422.06	482.58	543.25	604.08	1
2	2.00	62.00	122.03	182.09	242.20	302.39	362.67	423.06	483.59	544.26	605.10	2
3	3.00	63.00	123.03	183.09	243.20	303.39	363.67	424.07	484.60	545.27	606.12	3
4	4.00	64.00	124.03	184.09	244.20	304.40	364.68	425.08	485.61	546.28	607.13	4
5	5.00	65.00	125.03	185.09	245.21	305.40	365.69	426.09	486.62	547.30	608.15	5
6	6.00	66.00	126.03	186.09	246.21	306.40	366.69	427.09	487.63	548.31	609.16	6
7	7.00	67.00	127.03	187.09	247.21	307.41	367.70	428.10	488.64	549.32	610.18	7
8	8.00	68.00	128.03	188.09	248.21	308.41	368.70	429.11	489.65	550.34	611.19	8
9	9.00	69.00	129.03	189.09	249.22	309.42	369.71	430.12	490.66	551.35	612.21	9
10	10.00	70.00	130.03	190.10	250.22	310.42	370.72	431.13	491.67	552.36	613.23	10
11	11.00	71.00	131.03	191.10	251.22	311.42	371.72	432.13	492.68	553.37	614.24	11
12	12.00	72.00	132.03	192.10	252.23	312.43	372.73	433.14	493.69	554.39	615.26	12
13	13.00	73.00	133.03	193.10	253.23	313.43	373.74	434.15	494.70	555.40	616.27	13
14	14.00	74.01	134.03	194.10	254.23	314.44	374.74	435.16	495.71	556.41	617.29	14
15	15.00	75.01	135 03	195.10	255.23	315.44	375.75	436.17	496.72	557.43	618.31	15
16	16.00	76.01	136.03	196.11	256.24	316.45	376.75	437.17	497.73	558.44	619.32	16
17	17.00	77.01	137.04	197.11	257.24	317.45	377.76	438.18	498.74	559.45	620.34	17
18	18.00	78.01	138.04	198.11	258.24	318.45	378.76	439.19	499.75	560.47	621.36	18
19	19.00	79.01	139.04	199.11	259.25	319.46	379.77	440.20	500.76	561.48	622.37	19
20	20.00	80.01	140.04	200.11	260.25	320.46	380.78	441.21	501.77	562.49	623.39	20
21	21.00	81.01	141.04	201.11	261.25	321.47	381.78	442.21	502.78	563.51	624.40	21
22	22.00	82.01	142.04	202.12	262.25	322.47	382.79	443.22	503.79	564.52	625.42	22
23	23.00	83.01	143.04	203.12	263.26	323.48	383.79	444.23	504.80	565.53	626.44	23
24	24.00	84.01	144.04	204.12	264.26	324.48	384.80	445.24	505.81	566.55	627.45	24
25	25.00	85.01	145.04	205.12	265.26	325.48	385.81	446.25	506.83	567.56	628.47	25
26	26.00	86.01	146.04	206.12	266.27	326.49	386.81	447.26	507.84	568.57	629.49	26
27	27.00	87.01	147.04	207.13	267.27	327.49	387.82	448.26	508.85	569.59	630.50	27
28	28.00	88.01	148.05	208.13	268.27	328.50	388.83	449.27	509.86	570.60	631.52	28
29	29.00	89.01	149.05	209.13	269.27	329.50	389.83	450.28	510.87	571.62	632.54	29
30	30.00	90.01	150.05	210.13	270.28	330.51	390.84	451.29	511.88	572.63	633.56	30
31	31.00	91.01	151.05	211.13	271.28	331.51	391.85	452.30	512.89	573.64	634.57	31
32	32.00	92.01	152.05	212.13	272.28	332.52	392.85	453.31	513.90	574.66	635.59	32
33	33.00	93.01	153.05	213.14	273.29	333.52	393.86	454.32	514.91	575.67	636.61	33
34	34.00	94.01	154.05	214 14	274.29	334.53	394.86	455.33	515.93	576.69	637.62	34
35	35.00	95.01	155.05	215.14	275.29	335 53	395.87	456.33	516.94	577.70	638.64	35
36	36.00	96.01	156.05	216.14	276.30	336.54	396.88	457.34	517.95	578.71	639.66	36
37	37.00	97.01	157.05	217.14	277.30	337.54	397.88	458.35	518.96	579.73	640.68	37
38	38.00	98.01	158.06	218.15	278.30	338.55	398.89	459.36	519.97	580.74	641.69	38
39	39.00	99.01	159.06	219.15	279.31	339.55	399.90	460.37	520.98	581.76	642.71	39
40	40.00	100.01	160.06	220.15	280.31	340.56	400.91	461.38	521.99	582.77	643.73	40
41	41.00	101.01	161.06	221.15	281.31	341.56	401.91	462.39	523.01	583.79	644.75	41
42	42.00	102.01	162.06	222.15	282.32	342.57	402.92	463.40	524.02	584.80	645.76	42
43	43.00	103.02	163.06	223.16	283.32	343.57	403.93	464.41	525.03	585.81	646 78	43
44	44.00	104.02	164.06	224.16	284.32	344.58	404.93	465.41	526.04	586.83	647.80	44
45	45.00	105.02	165.06	225.16	285.33	345.58	405.94	466.42	527.05	587.84	648.82	45
46	46.00	106.02	166.06	226.16	286.33	346.59	406.95	467.43	528.06	588.86	649.84	46
47	47.00	107.02	167.07	227.16	287.33	347.59	407.95	468.44	529.08	589.87	650.85	47
48	48.00	108.02	168.07	228.17	288.34	348.60	408.96	469.45	530.09	590.89	651.87	48
49	49.00	109.02	169.07	229.17	289.34	349.60	409 97	470.46	531.10	591.90	652.89	49
50	50.00	110.02	170.07	230.17	290.34	350.61	410.97	471.47	532.11	592.92	653.91	50
51	51.00	111.02	171.07	231.17	291.35	351.31	411.98	472.48	533.12	593.93	654.93	51
52	52.00	112.02	172.07	232.18	292.35	352.62	412.99	473.49	534.14	594.95	655.94	52
53	53.00	113.02	173.07	233.18	293.35	353.62	414.00	474.50	535.15	595.96	656.96	53
54	54.00	114.02	174.07	234.18	294.36	354.63	415.00	475.51	536.16	596.98	657.98	54
55	55.00	115.02	175.07	235.18	295.36	355.63	416.01	476.52	537.17	597.99	659 00	55
56	56.00	116.02	176.08	236.18	296.37	356.64	417.02	477.53	538.18	599.01	660.02	56
57	57.00	117.02	177.08	237.19	297.37	357.64	418.03	478.54	539.20	600.02	661.04	57
58	58.00	118.02	178.08	238.19	298.37	358.65	419.03	479.55	540.21	601.04	662.05	58
59	59.00	119.02	179.08	239.19	299.38	359.65	420.04	480.56	541.22	602.05	663.07	59
60	60.00	120.02	180.08	240.19	300.38	360.66	421.05	481.57	542.23	603.07	664.09	60
Lat.	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	10°	

Meridional Parts.

Lat.	11°	12°	13°	14°	15°	16°	17°	18°	19°	20°	
0′	664.09	725.32	786.78	848.49	910.46	972.73	1035.30	1098.22	1161.49	1225.14	0′
1	665.11	726.34	787.81	849.52	911.50	973.77	1036.35	1099.27	1162.54	1226.20	1
2	666.13	727.37	788.83	850.55	912.53	974.81	1037.40	1100.32	1163.60	1227.27	2
3	667.15	728.39	789.86	851.58	913.57	975.85	1038.44	1101.37	1164.66	1228.33	3
4	668.17	729.41	790.89	852.61	914.60	976.89	1039.49	1102.42	1165.72	1229.40	4
5	669.19	730.43	791.91	853.64	915.64	977.93	1040.53	1103.47	1166.78	1230.46	5
6	670.21	731.46	792.94	854.67	916.67	978.97	1041.58	1104.53	1167.83	1231.53	6
7	671.22	732.48	793.97	855.70	917.71	980.01	1042.63	1105.58	1168.89	1232.59	7
8	672.24	733.50	794.99	856.73	918.75	981.05	1043.67	1106.63	1169.95	1233.66	8
9	673.26	734.53	796.02	857.76	919.78	982.09	1044.72	1107.68	1171.01	1234.72	9
10	674.28	735.55	797.04	858.80	920.82	983.13	1045.77	1108.74	1172.07	1235.79	10
11	675.30	736.57	798.07	859.83	921.85	984.17	1046.81	1109.79	1173.13	1236.85	11
12	676.32	737.59	799.10	860.86	922.89	985.22	1047.86	1110.84	1174.19	1237.92	12
13	677.34	738.62	800.13	861.89	923.93	986.26	1048.91	1111.89	1175.24	1238.98	13
14	678.36	739.64	801.15	862.92	924.96	987.30	1049.95	1112.95	1176.30	1240.05	14
15	679.38	740.66	802.18	863.95	926.00	988.34	1051.00	1114.00	1177.36	1241.11	15
16	680.40	741.69	803.21	864.98	927.03	989.38	1052.05	1115.05	1178.42	1242.18	16
17	681.42	742.71	804.24	866.02	928.07	990.42	1053.09	1116.11	1179.48	1243.25	17
18	682.44	743.73	805.26	867.05	929.11	991.47	1054.14	1117.16	1180.54	1244.31	18
19	683.46	744.76	806.29	868.08	930.15	992.51	1055.19	1118.21	1181.60	1245.38	19
20	684.48	745.78	807.32	869.11	931.18	993.55	1056.24	1119.27	1182.66	1246.44	20
21	685.50	746.81	808.35	870.14	932.22	994.59	1057.28	1120.32	1183.72	1247.51	21
22	686.52	747.83	809.37	871.18	933.26	995.63	1058.33	1121.37	1184.78	1248.58	22
23	687.54	748.85	810.40	872.21	934.29	996.68	1059.38	1122.43	1185.84	1249.64	23
24	688.56	749.88	811.43	873.24	935.33	997.72	1060.43	1123.48	1186.90	1250.71	24
25	689.58	750.90	812.46	874.27	936.37	998.76	1061.48	1124.53	1187.96	1251.78	25
26	690.60	751.92	813.49	875.31	937.40	999.80	1062.53	1125.59	1189.02	1252.85	26
27	691.62	752.95	814.52	876.34	938.44	1000.85	1063.57	1126.64	1190.08	1253.91	27
28	692.64	753.97	815.54	877.37	939.48	1001.89	1064.62	1127.70	1191.14	1254.98	28
29	693.66	755.00	816.57	878.40	940.52	1002.93	1065.67	1128.75	1192.20	1256.05	29
30	694.68	756.02	817.60	879.44	941.56	1003.97	1066.72	1129.81	1193.26	1257.12	30
31	695.70	757.05	818.63	880.47	942.59	1005.02	1067.77	1130.86	1194.32	1258.18	31
32	696.72	758.07	819.66	881.50	943.63	1006.06	1068.81	1131.92	1195.39	1259.25	32
33	697.74	759.09	820.69	882.54	944.67	1007.10	1069.86	1132.97	1196.45	1260.32	33
34	698.76	760.12	821.71	883.57	945.71	1008.15	1070.91	1134.03	1197.51	1261.39	34
35	699.78	761.14	822.74	884.60	946.74	1009.19	1071.96	1135.08	1198.57	1262.45	35
36	700.80	762.17	823.77	885.64	947.78	1010.23	1073.01	1136.14	1199.63	1263.52	36
37	701.82	763.19	824.80	886.67	948.82	1011.28	1074.06	1137.19	1200.69	1264.59	37
38	702.85	764.22	825.83	887.70	949.86	1012.32	1075.11	1138.25	1201.75	1265.66	38
39	703.87	765.24	826.86	888.74	950.90	1013.36	1076.16	1139.30	1202.82	1266.73	39
40	704.89	766.27	827.89	889.77	951.94	1014.41	1077.21	1140.36	1203.88	1267.80	40
41	705.91	767.29	828.92	890.80	952.98	1015.45	1078.26	1141.41	1204.94	1268.87	41
42	706.93	768.32	829.95	891.84	954.01	1016.50	1079.31	1142.47	1206.00	1269.93	42
43	707.95	769.34	830.98	892.87	955.05	1017.54	1080.36	1143.52	1207.06	1271.00	43
44	708.97	770.37	832.00	893.91	956.09	1018.58	1081.41	1144.58	1208.13	1272.07	44
45	709.99	771.39	833.03	894.94	957.13	1019.63	1082.46	1145.64	1209.19	1273.14	45
46	711.02	772.42	834.06	895.97	958.17	1020.67	1083.51	1146.69	1210.25	1274.21	46
47	712.04	773.44	835.09	897.01	959.21	1021.72	1084.56	1147.75	1211.31	1275.28	47
48	713.06	774.47	836.12	898.04	960.25	1022.76	1085.61	1148.80	1212.38	1276.35	48
49	714.08	775.49	837.15	899.08	961.29	1023.81	1086.66	1149.86	1213.44	1277.42	49
50	715.10	776.52	838.18	900.11	962.33	1024.85	1087.71	1150.92	1214.50	1278.49	50
51	716.12	777.54	839.21	901.15	963.37	1025.90	1088.76	1151.97	1215.57	1279.56	51
52	717.15	778.57	840.24	902.18	964.41	1026.94	1089.81	1153.03	1216.63	1280.63	52
53	718.17	779.59	841.27	903.22	965.45	1027.99	1090.86	1154.09	1217.69	1281.70	53
54	719.19	780.62	842.30	904.25	966.49	1029.03	1091.91	1155.14	1218.76	1282.77	54
55	720.21	781.65	843.33	905.28	967.53	1030.08	1092.96	1156.20	1219.82	1283.84	55
56	721.23	782.67	844.36	906.32	968.57	1031.12	1094.01	1157.26	1220.88	1284.91	56
57	722.26	783.70	845.39	907.35	969.61	1032.17	1095.06	1158.32	1221.95	1285.98	57
58	723.28	784.73	846.42	908.39	970.65	1033.21	1096.11	1159.37	1223.01	1287.05	58
59	724.30	785.75	847.45	909.43	971.69	1034.26	1097.16	1160.43	1224.07	1288.13	59
60	725.32	786.78	848.49	910.46	972.73	1035.30	1098.22	1161.49	1225.14	1289.20	60
Lat.	11°	12°	13°	14°	15°	16°	17°	18°	19°	20°	

Meridional Parts.

Lat.	21°	22°	23°	24°	25°	26°	27°	28°	29°	30°	
0′	1289.20	1353.69	1418.63	1484.06	1549.99	1616.47	1683.52	1751.16	1819.44	1888.38	0′
1	1290.27	1354.76	1419.72	1485.15	1551.10	1617.58	1684.64	1752.29	1820.58	1889.53	1
2	1291.34	1355.84	1420.80	1486.25	1552.20	1618.70	1685.76	1753.43	1821.72	1890.69	2
3	1292.41	1356.92	1421.89	1487.34	1553.31	1619.81	1686.88	1754.56	1822.87	1891.84	3
4	1293.48	1358.00	1422.98	1488.44	1554.41	1620.92	1688.01	1755.69	1824.01	1893.00	4
5	1294.55	1359.08	1424.06	1489.53	1555.51	1622.04	1689.13	1756.83	1825.16	1894.15	5
6	1295.63	1360.16	1425.15	1490.63	1556.62	1623.15	1690.25	1757.96	1826.30	1895.31	6
7	1296.70	1361.24	1426.24	1491.72	1557.72	1624.26	1691.38	1759.09	1827.44	1896.46	7
8	1297.77	1362.32	1427.32	1492.82	1558.83	1625.38	1692.50	1760.23	1828.59	1897.62	8
9	1298.84	1363.40	1428.41	1493.91	1559.93	1626.49	1693.62	1761.36	1829.73	1898.78	9
10	1299.91	1364.48	1429.50	1495.01	1561.04	1627.61	1694.75	1762.50	1830.88	1899.93	10
11	1300.99	1365.56	1430.59	1496.11	1562.14	1628.72	1695.87	1763.63	1832.02	1901.09	11
12	1302.06	1366.64	1431.68	1497.20	1563.25	1629.84	1697.00	1764.77	1833.17	1902.25	12
13	1303.13	1367.72	1432.76	1498.30	1564.35	1630.95	1698.12	1765.90	1834.32	1903.40	13
14	1304.20	1368.80	1433.85	1499.40	1565.46	1632.06	1699.25	1767.04	1835.46	1904.56	14
15	1305.28	1369.88	1434.94	1500.49	1566.56	1633.18	1700.37	1768.17	1836.61	1905.72	15
16	1306.35	1370.96	1436.03	1501.59	1567.67	1634.29	1701.50	1769.31	1837.75	1906.88	16
17	1307.42	1372.04	1437.12	1502.69	1568.77	1635.41	1702.62	1770.44	1838.90	1908.03	17
18	1308.50	1373.12	1438.21	1503.78	1569.88	1636.52	1703.75	1771.58	1840.05	1909.19	18
19	1309.57	1374.20	1439.29	1504.88	1570.99	1637.64	1704.87	1772.71	1841.19	1910.35	19
20	1310.64	1375.28	1440.38	1505.98	1572.09	1638.76	1706.00	1773.85	1842.34	1911.51	20
21	1311.72	1376.36	1441.47	1507.08	1573.20	1639.87	1707.12	1774.98	1843.49	1912.67	21
22	1312.79	1377.44	1442.56	1508.17	1574.31	1640.99	1708.25	1776.12	1844.64	1913.83	22
23	1313.86	1378.52	1443.65	1509.27	1575.41	1642.10	1709.37	1777.26	1845.78	1914.98	23
24	1314.94	1379.61	1444.74	1510.37	1576.52	1643.22	1710.50	1778.39	1846.93	1916.14	24
25	1316.01	1380.69	1445.83	1511.47	1577.63	1644.34	1711.63	1779.53	1848.08	1917.30	25
26	1317.08	1381.77	1446 92	1512.57	1578.73	1645.45	1712.75	1780.67	1849.23	1918.46	26
27	1318.16	1382.85	1448.01	1513.67	1579.84	1646.57	1713.88	1781.81	1850.37	1919.62	27
28	1319.23	1383.93	1449.10	1514.76	1580.95	1647.69	1715.01	1782.94	1851.52	1920.78	28
29	1320.31	1385.02	1450.19	1515.86	1582.06	1648.80	1716.14	1784.08	1852.67	1921.94	29
30	1321.38	1386.10	1451.28	1516.96	1583.17	1649.92	1717.26	1785.22	1853.82	1923.10	30
31	1322.45	1387.18	1452.37	1518.06	1584.27	1651.04	1718.39	1786.36	1854.97	1924.26	31
32	1323.53	1388.26	1453.46	1519.16	1585.38	1652.16	1719.52	1787.50	1856.12	1925.43	32
33	1324.60	1389.35	1454.55	1520.26	1586 49	1653.27	1720.65	1788.63	1857.27	1926.59	33
34	1325.68	1390.43	1455.64	1521.36	1587.60	1654.39	1721.77	1789.77	1858.42	1927.75	34
35	1326.75	1391.51	1456.73	1522.46	1588.71	1655.51	1722.90	1790.91	1859.57	1928.91	35
36	1327.83	1392.59	1457.83	1523.56	1589.82	1656.63	1724.03	1792.05	1860.72	1930.07	36
37	1328.90	1393.68	1458.92	1524.66	1590.92	1657.75	1725.16	1793.19	1861.87	1931.23	37
38	1329.98	1394.76	1460.01	1525.76	1592.03	1658.87	1726.29	1794.33	1863.02	1932.40	38
39	1331 06	1395.84	1461.10	1526.86	1593.14	1659.98	1727.42	1795.47	1864.17	1933.56	39
40	1332.13	1396.93	1462.19	1527.96	1594.25	1661.10	1728.54	1796.61	1865.32	1934.72	40
41	1333.21	1398.01	1463.28	1529.06	1595.36	1662.22	1729 67	1797.75	1866.47	1935.88	41
42	1334.29	1399.10	1464.38	1530.16	1596.47	1663.34	1730.80	1798.89	1867.62	1937.05	42
43	1335.37	1400.18	1465.47	1531.26	1597.58	1664.46	1731.93	1800.03	1868.77	1938.21	43
44	1336.44	1401.26	1466.56	1532.36	1598.69	1665.58	1733.06	1801.17	1869.92	1939.37	44
45	1337.52	1402.35	1467.65	1533.46	1599.80	1666.70	1734.19	1802.31	1871.08	1940.54	45
46	1338.60	1403.43	1468.75	1534.56	1600.91	1667.82	1735.32	1803.45	1872.23	1941.70	46
47	1339.67	1404.52	1469.84	1535.66	1602.02	1668.94	1736.45	1804.59	1873.38	1942.86	47
48	1340.75	1405.60	1470.93	1536.77	1603.13	1670.06	1737.58	1805.73	1874.53	1944.03	48
49	1341.83	1406.69	1472.02	1537.87	1604.24	1671.18	1738.71	1806.87	1875.69	1945.19	49
50	1342.91	1407.77	1473.12	1538.97	1605.35	1672.30	1739.84	1808.01	1876.84	1946.36	50
51	1343.98	1408.86	1474 21	1540.07	1606.46	1673.42	1740.98	1809.15	1877.99	1947.52	51
52	1345.06	1409.94	1475.30	1541.17	1607.58	1674.54	1742.11	1810.30	1879.14	1948.69	52
53	1346.14	1411.03	1476.40	1542.27	1608.69	1675.66	1743.24	1811.44	1880.30	1949.85	53
54	1347.22	1412.11	1477.49	1543.38	1609.80	1676.79	1744.37	1812.58	1881.45	1951.02	54
55	1348.29	1413.20	1478.59	1544 48	1610.91	1677.91	1745.50	1813.72	1882.60	1952.18	55
56	1349.37	1414.28	1479.68	1545.58	1612.02	1679.03	1746.63	1814.86	1883.76	1953.35	56
57	1350.45	1415.37	1480.77	1546.69	1613.13	1680.15	1747.76	1816.01	1884.91	1954.51	57
58	1351.53	1416.46	1481.87	1547.79	1614.25	1681.27	1748.90	1817.15	1886.07	1955.68	58
59	1352.61	1417.54	1482.96	1548.89	1615.36	1682.39	1750.03	1818.29	1887.22	1956.85	59
60	1353.69	1418.63	1484.06	1549.99	1616.47	1683.52	1751.16	1819.44	1888.38	1958.01	60
Lat.	21°	22°	23°	24°	25°	26°	27°	28°	29°	30°	

Meridional Parts.

Lat.	31°	32°	33°	34°	35°	36°	37°	38°	39°	40°	
0′	1958.01	2028.38	2099.53	2171.48	2244.29	2317.99	2392.63	2468.26	2544.93	2622.69	0′
1	1959.18	2029.56	2100.72	2172.69	2245.51	2319.23	2393.88	2469.53	2546.22	2624.00	1
2	1960.35	2030.74	2101.91	2173.89	2246.73	2320.46	2395.14	2470.80	2547.50	2625.30	2
3	1961.51	2031.92	2103.10	2175.10	2247.95	2321.70	2396.39	2472.07	2548.79	2626.61	3
4	1962.68	2033.10	2104.30	2176.31	2249.17	2322.93	2397.64	2473 34	2550.08	2627.91	4
5	1963.85	2034.28	2105.49	2177.51	2250.39	2324.17	2398.90	2474.61	2551.37	2629.22	5
6	1965.02	2035.46	2106.68	2178.72	2251.62	2325.41	2400.15	2475.88	2552.66	2630.53	6
7	1966.18	2036.64	2107.88	2179.93	2252.84	2326.65	2401.40	2477.15	2553.95	2631.84	7
8	1967.35	2037.82	2109.07	2181.14	2254.06	2327.89	2402.66	2478.42	2555.23	2633.14	8
9	1968.52	2039.00	2110.27	2182.35	2255.28	2329.12	2403.91	2479.69	2556.52	2634.45	9
10	1969.69	2040.19	2111.46	2183.55	2256.51	2330.36	2405.17	2480.97	2557.81	2635.76	10
11	1970.86	2041.37	2112.66	2184.76	2257.73	2331.60	2406.42	2482.24	2559.10	2637.07	11
12	1972.03	2042.55	2113.85	2185.97	2258.95	2332.84	2407.68	2483.51	2560.39	2638.38	12
13	1973.20	2043.73	2115.05	2187.18	2260.18	2334.08	2408.93	2484.78	2561.68	2639.69	13
14	1974.37	2044.91	2116.24	2188.39	2261.40	2335.32	2410.19	2486.06	2562.97	2641.00	14
15	1975.54	2046.10	2117.44	2189.60	2262.63	2336.56	2411.44	2487.33	2564.27	2642.31	15
16	1976.71	2047.28	2118.63	2190.81	2263.85	2337.80	2412.70	2488.60	2565.56	2643.62	16
17	1977.88	2048.46	2119.83	2192.02	2265.08	2339.04	2413.96	2489.88	2566.85	2644.93	17
18	1979.05	2049.64	2121.03	2193.23	2266.30	2340.28	2415.21	2491.15	2568.14	2646.24	18
19	1980.22	2050.83	2122.22	2194.44	2267.53	2341.52	2416.47	2492.43	2569.43	2647.55	19
20	1981.39	2052.01	2123.42	2195.65	2268.75	2342.76	2417.73	2493.70	2570.73	2648.86	20
21	1982.56	2053.19	2124.62	2196.86	2269.98	2344.00	2418.99	2494.97	2572.02	2650.17	21
22	1983.73	2054.38	2125.81	2198.07	2271.20	2345.25	2420.24	2496.25	2573.31	2651.49	22
23	1984.90	2055.56	2127.01	2199.29	2272.43	2346.49	2421.50	2497.52	2574.61	2652.80	23
24	1986.07	2056.75	2128.21	2200.50	2273.66	2347.73	2422.76	2498.80	2575.90	2654.11	24
25	1987.24	2057.93	2129.41	2201.71	2274.88	2348.97	2424.02	2500.08	2577.19	2655.43	25
26	1988.41	2059.11	2130.61	2202.92	2276.11	2350.21	2425.28	2501.35	2578.49	2656.74	26
27	1989.59	2060.30	2131.80	2204.14	2277.34	2351.46	2426.54	2502.63	2579.78	2658.05	27
28	1990.76	2061.49	2133.00	2205.35	2278.57	2352.70	2427.80	2503.91	2581.08	2659.37	28
29	1991.93	2062.67	2134.20	2206.56	2279.79	2353.95	2429.06	2505.18	2582.37	2660.68	29
30	1993.10	2063.86	2135.40	2207.78	2281.02	2355.19	2430.32	2506.46	2583.67	2662.00	30
31	1994.28	2065.04	2136.60	2208.99	2282.25	2356.43	2431.58	2507.74	2584.97	2663.31	31
32	1995.45	2066.23	2137.80	2210.20	2283.48	2357.68	2432.84	2509.02	2586.26	2664.63	32
33	1996.62	2067.41	2139.00	2211.42	2284.71	2358.92	2434.10	2510.30	2587.56	2665.94	33
34	1997.80	2068.60	2140.20	2212.63	2285.94	2360.17	2435.36	2511.58	2588.86	2667.26	34
35	1998.97	2069.79	2141.40	2213.84	2287.17	2361.41	2436.62	2512.86	2590.15	2668.58	35
36	2000.14	2070.97	2142.60	2215.06	2288.40	2362.66	2437.89	2514.14	2591.45	2669.89	36
37	2001.32	2072.16	2143.80	2216.27	2289.63	2363.90	2439.15	2515.41	2592.75	2671.21	37
38	2002.49	2073.35	2145.00	2217.49	2290.86	2365.15	2440.41	2516.69	2594.05	2672.53	38
39	2003.67	2074.54	2146.20	2218.70	2292.09	2366.40	2441.68	2517.97	2595.35	2673.85	39
40	2004.84	2075.72	2147.40	2219.92	2293.32	2367.64	2442.94	2519.25	2596.65	2675.16	40
41	2006.02	2076.91	2148.61	2221.14	2294.55	2368.89	2444.20	2520.54	2597.95	2676.48	41
42	2007.19	2078.10	2149.81	2222.35	2295.78	2370.14	2445.47	2521.82	2599.24	2677.80	42
43	2008.37	2079.29	2151.01	2223.57	2297.01	2371.38	2446.73	2523.10	2600.54	2679.12	43
44	2009.54	2080.48	2152.21	2224.79	2298.24	2372.63	2447.99	2524.38	2601.84	2680.44	44
45	2010.72	2081.67	2153.41	2226.00	2299.48	2373.88	2449.26	2525.66	2603.14	2681.76	45
46	2011.90	2082.86	2154.62	2227.22	2300.71	2375.13	2450.52	2526 95	2604.45	2683.08	46
47	2013.07	2084.04	2155.82	2228.44	2301.94	2376.38	2451.79	2528.23	2605.75	2684.40	47
48	2014.25	2085.23	2157.02	2229.66	2303.17	2377.63	2453.05	2529.51	2607.05	2685.72	48
49	2015.43	2086.42	2158.23	2230.87	2304.41	2378.87	2454 32	2530.79	2608.35	2687.04	49
50	2016.60	2087.61	2159.43	2232.09	2305.64	2380.12	2455.58	2532.08	2609.65	2688.36	50
51	2017.78	2088.80	2160.63	2233.31	2306.88	2381.37	2456.85	2533.36	2610.95	2689.69	51
52	2018.96	2089.99	2161.84	2234.53	2308.11	2382.62	2458.12	2534.65	2612.26	2691.01	52
53	2020.13	2091.19	2163.04	2235.75	2309.34	2383.87	2459.39	2535.93	2613.56	2692.33	53
54	2021.31	2092.38	2164.25	2236.97	2310.58	2385.12	2460.65	2537.22	2614.86	2693.65	54
55	2022.49	2093.57	2165.45	2238.19	2311.81	2386.37	2461.92	2538.50	2616.17	2694.98	55
56	2023.67	2094.76	2166.66	2239.41	2313.05	2387.62	2463.19	2539.79	2617.47	2696 30	56
57	2024.85	2095 95	2167.86	2240.63	2314.28	2388.88	2464.46	2541.07	2618.78	2697.63	57
58	2026.03	2097.14	2169.07	2241.85	2315.52	2390.13	2465.72	2542.36	2620.08	2698 95	58
59	2027.20	2098.33	2170.28	2243.07	2316.75	2391.38	2466.99	2543.64	2621.38	2700.27	59
60	2028.38	2099.53	2171.48	2244.29	2317.99	2392.63	2468.26	2544.93	2622.69	2701.60	60
Lat.	31°	32°	33°	34°	35°	36°	37°	38°	39°	40°	

Meridional Parts.

Lat.	41°	42°	43°	44°	45°	46°	47°	48°	49°	50°	
0′	2701.60	2781.71	2863.10	2945.81	3029.94	3115.55	3202.71	3291.53	3382.08	3474.47	0′
1	2702.92	2783.06	2864.46	2947.21	3031.35	3116.99	3204.18	3293.02	3383.61	3476.03	1
2	2704.25	2784.40	2865.83	2948.60	3032.77	3118.43	3205.65	3294.52	3385.13	3477.59	2
3	2705.57	2785.75	2867.20	2949.99	3034.18	3119.87	3207.12	3296.01	3386.66	3479.14	3
4	2706.90	2787.09	2868.57	2951.38	3035.60	3121.31	3208.58	3297.51	3388.18	3480.70	4
5	2708.23	2788.44	2869.94	2952.77	3037.02	3122.75	3210.05	3299.01	3389.71	3482.26	5
6	2709.55	2789.79	2871.31	2954.16	3038.43	3124.19	3211.52	3300.51	3391.24	3483.82	6
7	2710.88	2791.14	2872.68	2955.56	3039.85	3125.63	3212.99	3302.00	3392.77	3485.38	7
8	2712.21	2792.49	2874.05	2956.95	3041.27	3127.08	3214.46	3303.50	3394.29	3486.94	8
9	2713.54	2793.84	2875.42	2958.34	3042.68	3128.52	3215.93	3305.00	3395.82	3488.50	9
10	2714.86	2795.19	2876.79	2959.74	3044.10	3129.96	3217.40	3306.50	3397.35	3490.06	10
11	2716.19	2796.54	2878.16	2961.13	3045.52	3131.41	3218.87	3308.00	3398.88	3491.62	11
12	2717.52	2797.89	2879.53	2962.53	3046.94	3132.85	3220.34	3309.50	3400.41	3493.18	12
13	2718.85	2799.24	2880.90	2963.92	3048.36	3134.30	3221.82	3311.00	3401.94	3494.74	13
14	2720.18	2800.59	2882.28	2965.32	3049.78	3135.75	3223.29	3312.50	3403.47	3496.31	14
15	2721.51	2801.94	2883.65	2966.71	3051.20	3137.19	3224.76	3314.00	3405.00	3497.87	15
16	2722.84	2803.29	2885.02	2968.11	3052.62	3138.64	3226.23	3315.50	3406.54	3499.43	16
17	2724.17	2804.64	2886.39	2969.50	3054.04	3140.08	3227.71	3317.00	3408.07	3501.00	17
18	2725.50	2805.99	2887.77	2970.90	3055.46	3141.53	3229.18	3318.51	3409.60	3502.56	18
19	2726.83	2807.34	2889.14	2972.30	3056.88	3142.98	3230.66	3320.01	3411.14	3504.13	19
20	2728.17	2808.70	2890.52	2973.70	3058.31	3144.42	3232.13	3321.52	3412.67	3505.70	20
21	2729.50	2810.05	2891.89	2975.09	3059.73	3145.87	3233.61	3323.02	3414.20	3507.26	21
22	2730.83	2811.40	2893.27	2976.49	3061.15	3147.32	3235.08	3324.53	3415.74	3508.83	22
23	2732.16	2812.76	2894.64	2977.89	3062.58	3148.77	3236.56	3326.03	3417.28	3510.40	23
24	2733.50	2814.11	2896.02	2979.29	3064.00	3150.22	3238.04	3327.54	3418.81	3511.97	24
25	2734.83	2815.46	2897.40	2980.69	3065.42	3151.67	3239.52	3329.04	3420.35	3513.54	25
26	2736.16	2816.82	2898.77	2982.09	3066.85	3153.12	3240.99	3330.55	3421.89	3515.11	26
27	2737.50	2818.17	2900.15	2983.49	3068.27	3154.57	3242.47	3332.06	3423.43	3516.68	27
28	2738.83	2819.53	2901.53	2984.89	3069.70	3156.03	3243.95	3333.56	3424.96	3518.25	28
29	2740.17	2820.88	2902.91	2986.29	3071.13	3157.48	3245.43	3335.07	3426.50	3519.82	29
30	2741.50	2822.24	2904.28	2987.70	3072.55	3158.93	3246.91	3336.58	3428.04	3521.39	30
31	2742.84	2823.60	2905.66	2989.10	3073.98	3160.38	3248.39	3338.09	3429.58	3522.96	31
32	2744.17	2824.95	2907.04	2990.50	3075.41	3161.84	3249.87	3339.60	3431.12	3524.54	32
33	2745.51	2826.31	2908.42	2991.90	3076.34	3163.29	3251.35	3341.11	3432.66	3526.11	33
34	2746.84	2827.67	2909.80	2993.31	3078.26	3164.74	3252.84	3342.62	3434.20	3527.68	34
35	2748.18	2829.03	2911.18	2994.71	3079.69	3166.20	3254.32	3344.14	3435.75	3529.26	35
36	2749.52	2830.39	2912.56	2996.12	3081.12	3167.65	3255.80	3345.65	3437.29	3530.83	36
37	2750.85	2831.74	2913.94	2997.52	3082.55	3169.11	3257.28	3347.16	3438.83	3532.41	37
38	2752.19	2833.10	2915.32	2998.93	3083.98	3170.57	3258.77	3348.67	3440.38	3533.99	38
39	2753.53	2834.46	2916.71	3000.33	3085.41	3172.02	3260.25	3350.19	3441.92	3535.56	39
40	2754.87	2835.82	2918.09	3001.74	3086.84	3173.48	3261.74	3351.70	3443.47	3537.14	40
41	2756.21	2837.18	2919.47	3003.14	3088.27	3174.94	3263.22	3353.21	3445.01	3538.72	41
42	2757.55	2838.54	2920.85	3004.55	3089.70	3176.40	3264.71	3354.73	3446.56	3540.30	42
43	2758.89	2839.90	2922.24	3005.96	3091.14	3177.85	3266.19	3356.24	3448.10	3541.88	43
44	2760.23	2841.27	2923.62	3007.36	3092.57	3179.31	3267.68	3357.76	3449.65	3543.45	44
45	2761.57	2842.63	2925.01	3008.77	3094.00	3180.77	3269.17	3359.28	3451.20	3545.04	45
46	2762.91	2843.99	2926.39	3010.18	3095.43	3182.23	3270.65	3360.79	3452.75	3546.62	46
47	2764.25	2845.35	2927.78	3011.59	3096.87	3183.69	3272.14	3362.31	3454.29	3548.20	47
48	2765.59	2846.71	2929.16	3013.00	3098.30	3185.15	3273.63	3363.83	3455.84	3549.78	48
49	2766.93	2848.06	2930.55	3014.41	3099.74	3186.61	3275.12	3365.35	3457.39	3551.36	49
50	2768.27	2849.44	2931.93	3015.82	3101.17	3188.07	3276.61	3366.87	3458.94	3552.94	50
51	2769.62	2850.81	2933.32	3017.23	3102.60	3189.54	3278.10	3368.39	3460.49	3554.53	51
52	2770.96	2852.17	2934.71	3018.64	3104.04	3191.00	3279.59	3369.91	3462.04	3556.11	52
53	2772.30	2853.53	2936.09	3020.05	3105.48	3192.46	3281.08	3371.43	3463.60	3557.70	53
54	2773.64	2854.90	2937.48	3021.46	3106.92	3193.92	3282.57	3372.95	3465.15	3559.28	54
55	2774.99	2856.26	2938.87	3022.87	3108.35	3195.39	3284.06	3374.47	3466.70	3560.87	55
56	2776.33	2857.63	2940.26	3024.29	3109.79	3196.85	3285 56	3375.99	3468.26	3562.45	56
57	2777.68	2858.99	2941.65	3025.70	3111.23	3198.32	3287.05	3377.51	3469.81	3564.04	57
58	2779.02	2860.36	2943.04	3027.11	3112.67	3199.78	3288.54	3379.04	3471.36	3565.63	58
59	2780.37	2861.73	2944.42	3028.52	3114.11	3201.25	3290.04	3380.56	3472.92	3667.22	59
60	2781.71	2863.10	2945.81	3029.94	3115.55	3202.71	3291.53	3382.08	3474.47	3568.81	60
Lat.	41°	42°	43°	44°	45°	46°	47°	48°	49°	50°	

Meridional Parts.

Lat.	51°	52°	53°	54°	55°	56°	57°	58°	59°	60°	
0′	3568.81	3665.19	3763.76	3864.64	3967.97	4073.90	4182.62	4294.30	4409.14	4527.37	0′
1	3570.40	3666.82	3765.42	3866.34	3969.71	4075.69	4184.46	4296.19	4411.08	4529.37	1
2	3571.99	3668.44	3767.09	3868.04	3971.46	4077.48	4186.29	4298.07	4413.03	4531.37	2
3	3573.58	3670.07	3768.75	3869.74	3973.20	4079.27	4188.13	4299.96	4414.97	4533.37	3
4	3575.17	3671.70	3770.41	3871.45	3974.95	4081.06	4189.97	4301.85	4416.92	4535.38	4
5	3576.76	3673.32	3772.08	3873.15	3976.69	4082.86	4191.81	4303.74	4418.86	4537.38	5
6	3578.35	3674.95	3773.74	3874.86	3978.44	4084.65	4193.65	4305.64	4420.81	4539.39	6
7	3579.94	3676.58	3775.41	3876.56	3980.19	4086.44	4195.49	4307.53	4422.76	4541.39	7
8	3581.54	3678.21	3777.08	3878.27	3981.94	4088.24	4197.34	4309.42	4424.70	4543.40	8
9	3583.13	3679.84	3778.74	3879.98	3983.69	4090.03	4199.18	4311.32	4426.65	4545.41	9
10	3584.73	3681.47	3780.41	3881 68	3985.44	4091.83	4201.02	4313.21	4428.60	4547.42	10
11	3586.32	3683.10	3782.08	3883.39	3987.19	4093.62	4202.87	4315.11	4430.56	4549.43	11
12	3587.92	3684.73	3783.75	3885.10	3988.94	4095.42	4204.71	4317.01	4432.51	4551.44	12
13	3589.51	3686.36	3785.42	3886.81	3990.69	4097.22	4206.56	4318.91	4434.46	4553.45	13
14	3591.11	3687.99	3787.09	3888.52	3992.45	4099.02	4208.41	4320.80	4436.42	4555.47	14
15	3592.71	3689.63	3788.76	3890.23	3994.20	4100.82	4210.26	4322.70	4438.37	4557.48	15
16	3594.30	3691.26	3790.43	3891.95	3995.96	4102.62	4212.10	4324.61	4440.33	4559.50	16
17	3595.90	3692.90	3792.10	3893.66	3997.71	4104.42	4213.95	4326.51	4442.29	4561.52	17
18	3597.50	3694.53	3793.78	3895.37	3999.47	4106.22	4215.80	4328.41	4444.24	4563.53	18
19	3599.10	3696.17	3795.45	3897.09	4001.22	4108.02	4217.66	4330.31	4446.20	4565.55	19
20	3600.70	3697.80	3797.12	3898.80	4002.98	4109.82	4219.51	4332.22	4448.16	4567.57	20
21	3602.30	3699.44	3798.80	3900.52	4004.74	4111.63	4221.36	4334.12	4450.12	4569.59	21
22	3603.90	3701.08	3800.47	3902.23	4006.50	4113.44	4223.22	4336.03	4452.09	4571.61	22
23	3605.50	3702.71	3802.15	3903.95	4008.26	4115.24	4225.07	4337.94	4454.05	4573.64	23
24	3607.11	3704.35	3803.83	3905.67	4010.02	4117.05	4226.93	4339.84	4456.01	4575.66	24
25	3608.71	3705.99	3805.50	3907.38	4011.78	4118.85	4228.78	4341.75	4457.98	4577.69	25
26	3610.32	3707.63	3807.18	3909.10	4013.54	4120.66	4230.64	4343.66	4459.94	4579.71	26
27	3611.92	3709.27	3808.86	3910.82	4015.31	4122.47	4232.50	4345.57	4461.91	4581.74	27
28	3613.52	3710.91	3810.54	3912.54	4017.07	4124.28	4234.36	4347.48	4463.88	4583.77	28
29	3615.13	3712.56	3812.22	3914.26	4018.84	4126.09	4236.22	4349.40	4465.85	4585.80	29
30	3616.74	3714.20	3813.90	3915.99	4020.60	4127.90	4238.08	4351.31	4467.82	4587.83	30
31	3618.34	3715.84	3815.58	3917.71	4022.37	4129.72	4239.94	4353.23	4469.79	4589.86	31
32	3619.95	3717.48	3817.27	3919.43	4024.13	4131.53	4241.80	4355.14	4471.76	4591.89	32
33	3621.56	3719.13	3818.95	3921.16	4025.90	4133.34	4243.67	4357.06	4473.73	4593.92	33
34	3623.17	3720.77	3820.63	3922.88	4027.67	4135.16	4245.53	4358.97	4475.71	4595.96	34
35	3624.78	3722.42	3822.32	3924.61	4029.44	4136.97	4247.39	4360.89	4477.68	4598.00	35
36	3626.39	3724.06	3824.00	3926.33	4031.21	4138.79	4249.26	4362.81	4479.66	4600.03	36
37	3628.00	3725.71	3825.69	3928.06	4032.98	4140.61	4251.13	4364.73	4481.63	4602.07	37
38	3629.61	3727.36	3827.37	3929.79	4034.75	4142.42	4252.99	4366.65	4483.61	4604.11	38
39	3631.22	3729.01	3829.06	3931.51	4036.52	4144.24	4254.86	4368.57	4485.59	4606.15	39
40	3632.83	3730.66	3830.75	3933.24	4038.29	4146.06	4256.73	4370.50	4487.57	4608.19	40
41	3634.44	3732.30	3832.43	3934.97	4040.07	4147.88	4258.60	4372.42	4489.55	4610.23	41
42	3636.06	3733.95	3834.12	3936.70	4041.84	4149.70	4260.47	4374.34	4491.53	4612.27	42
43	3637.67	3735.61	3835.81	3938.43	4043.61	4151.52	4262.34	4376.27	4493.51	4614.32	43
44	3639.28	3737.26	3837.50	3940.16	4045.39	4153.35	4264.22	4378.20	4495.50	4616.36	44
45	3640.90	3738.91	3839.19	3941.90	4047.17	4155.17	4266.09	4380.12	4497.48	4618.41	45
46	3642.51	3740.56	3840.88	3943.63	4048.94	4157.00	4267.97	4382.05	4499.47	4620.45	46
47	3644.13	3742.21	3842.58	3945.36	4050.72	4158.82	4269.84	4383 98	4501.45	4622.50	47
48	3645.75	3743.87	3844.27	3947.10	4052.50	4160.65	4271.72	4385.91	4503.44	4624.55	48
49	3647.36	3745.52	3845.96	3948.83	4054.28	4162.47	4273.59	4387.84	4505.43	4626.60	49
50	3648.98	3747.18	3847.66	3950.57	4056.06	4164.30	4275.47	4389.77	4507.42	4628.65	50
51	3650.60	3748.83	3849.35	3952.31	4057.84	4166.13	4277.35	4391.70	4509.41	4630.71	51
52	3652.22	3750.49	3851.05	3954.04	4059.62	4167.96	4279.23	4393.64	4511.40	4632.76	52
53	3653.84	3752.15	3852.75	3955.78	4061.41	4169.79	4281.11	4395.57	4513.39	4634.81	53
54	3655.46	3753.80	3854.44	3957.52	4063.19	4171.62	4282.99	4397.51	4515.39	4636.87	54
55	3657.08	3755.46	3856.14	3959.26	4064.97	4173.45	4284.87	4399.44	4517.38	4638.93	55
56	3658.70	3757.12	3857.84	3961.00	4066.76	4175.28	4286.76	4401.38	4519.38	4640.98	56
57	3660.32	3758.78	3859.54	3962.74	4068.54	4177.12	4288.64	4403.32	4521.37	4643.04	57
58	3661.95	3760.44	3861.24	3964.48	4070.33	4178.95	4290.53	4405.26	4523.37	4645.10	58
59	3663.57	3762.10	3862.94	3966.22	4072.12	4180.78	4292.41	4407.20	4525.37	4647.16	59
60	3665.19	3763.76	3864.64	3967.97	4073.90	4182.62	4294.30	4409.14	4527.37	4649.23	60
Lat.	51°	52°	53°	54°	55°	56°	57°	58°	59°	60°	

Meridional Parts.

Lat.	61°	62°	63°	64°	65°	66°	67°	68°	69°	70°	
0′	4649.23	4774.98	4904.94	5039.42	5178.81	5323.51	5474.01	5630.82	5794.56	5965.92	0′
1	4651.29	4777.11	4907.14	5041.70	5181.18	5325.97	5476.57	5633.49	5797.35	5968.84	1
2	4653.35	4779.25	4909.35	5043.99	5183.54	5328.43	5479.13	5636.16	5800.14	5971.77	2
3	4655.42	4781.38	4911.55	5046.27	5185.91	5330.90	5481.69	5638.84	5802.94	5974.70	3
4	4657.49	4783.51	4913.76	5048.56	5188.29	5333.36	5484.26	5641.51	5805.74	5977.63	4
5	4659.55	4785.65	4915.97	5050.85	5190.66	5335.83	5486.83	5644.19	5808.54	5980.57	5
6	4661.62	4787.79	4918.18	5053.14	5193.03	5338.30	5489.40	5646.87	5811.34	5983.50	6
7	4663.69	4789.92	4920.39	5055.43	5195.41	5340.77	5491.97	5649.56	5814.15	5986.44	7
8	4665.76	4792.06	4922.60	5057.72	5197.79	5343.24	5494.54	5652.24	5816.95	5989.38	8
9	4667.83	4794.20	4924.81	5060.01	5200.17	5345.71	5497.11	5654.93	5819.76	5992.33	9
10	4669.91	4796.34	4927.03	5062.30	5202.55	5348.18	5499.69	5657.61	5822.57	5995.27	10
11	4671.98	4798.49	4929.24	5064.60	5204.93	5350.66	5502.27	5660.30	5825.39	5998.22	11
12	4674.06	4800.63	4931.46	5066.90	5207.31	5353.14	5504.85	5663.00	5828.20	6001.17	12
13	4676.13	4802.77	4933.68	5069.19	5209.70	5355.61	5507.43	5665.69	5831.02	6004.13	13
14	4678.21	4804.92	4935 90	5071.49	5212.08	5358.09	5510.01	5668.38	5833.84	6007.08	14
15	4680.29	4807.07	4938.12	5073.80	5214.47	5360.58	5512.60	5671.08	5836.66	6010.04	15
16	4682.37	4809.21	4940.34	5076.10	5216.86	5363.06	5515.18	5673.78	5839.48	6013.00	16
17	4684.45	4811.36	4942.57	5078.40	5219.25	5365.55	5517.77	5676.48	5842.31	6015.96	17
18	4686.53	4813.51	4944.79	5080.71	5221.64	5368.03	5520.36	5679.19	5845.13	6018.93	18
19	4688.61	4815.67	4947.62	5083.01	5224.04	5370.52	5522.95	5681.89	5847.96	6021.90	19
20	4690 70	4817.82	4949.24	5085.32	5226.43	5373.01	5525.55	5684.60	5850.79	6024.87	20
21	4692.78	4819.97	4951.47	5087.63	5228.33	5375.50	5528.14	5687.31	5853.63	6027.84	21
22	4694.87	4822.13	4953.70	5089.94	5231.23	5378.00	5530.74	5690.02	5856.47	6030.81	22
23	4696.96	4824.29	4955.94	5092.25	5233.63	5380.49	5533.34	5692.73	5859.31	6033.79	23
24	4699.05	4826.44	4958.17	5094.57	5236.03	5382.99	5535.94	5695.45	5862.15	6036.77	24
25	4701.14	4828.60	4960.40	5096.88	5238.43	5385.49	5538.55	5698.17	5864.99	6039.75	25
26	4703.23	4830.76	4962.64	5099.20	5240.84	5387.99	5541.15	5700.89	5867.84	6042.74	26
27	4705.32	4832.93	4964.88	5101.52	5243.24	5390.49	5543.76	5703.61	5870.69	6045.73	27
28	4707.41	4835.09	4967.11	5103.84	5245.65	5392.99	5546.37	5706.33	5873.54	6048.72	28
29	4709.51	4837.25	4969.35	5106.16	5248.06	5395.50	5548.98	5709.06	5876.39	6051.71	29
30	4711.60	4839.42	4971.59	5108.48	5250.47	5398.01	5551.59	5711.78	5879.24	6054.70	30
31	4713.70	4841.58	4973.83	5110.80	5252.88	5400.52	5554.20	5714.51	5882.10	6057.70	31
32	4715.79	4843.75	4976.08	5113.13	5255.30	5403.03	5556.82	5717.25	5884.96	6060.70	32
33	4717.89	4845.92	4978.32	5115.45	5257.71	5405.54	5559.44	5719.98	5887.82	6063.71	33
34	4719.99	4848.09	4980.57	5117.78	5260.13	5408.05	5562.06	5722.71	5890.68	6066.71	34
35	4722.09	4850.26	4982.82	5120.11	5262.55	5410.57	5564.68	5725.45	5893.55	6069.71	35
36	4724.19	4852.43	4985.06	5122.44	5264.97	5413.08	5567.30	5728.19	5896.41	6072.72	36
37	4726.30	4854.61	4987.31	5124.77	5267.39	5415.60	5569.93	5730.93	5899.28	6075.73	37
38	4728.40	4856.78	4989.56	5127.11	5269.81	5418.12	5572.55	5733.68	5902.15	6078.75	38
39	4730.51	4858.96	4991.82	5129.44	5272.23	5420.64	5575.18	5736.42	5905.03	6081.76	39
40	4732.61	4861.13	4994.07	5131.78	5274.66	5423.17	5577.81	5739.17	5907.90	6084.78	40
41	4734.72	4863.31	4996.32	5134.11	5277.09	5425.69	5580.44	5741.92	5910.78	6087.81	41
42	4736.83	4865.49	4998 58	5136.45	5279.52	5428.22	5583.08	5744.67	5913.67	6090.83	42
43	4738.94	4867.67	5000.84	5138.79	5281.95	5430.75	5585.71	5747.43	5916.55	6093.86	43
44	4741.05	4869.86	5003.10	5141.14	5284.38	5433.28	5588.35	5750.18	5919.44	6096.89	44
45	4743.16	4872.04	5005.36	5143.48	5286.82	5435.81	5590.99	5752.94	5922.33	6099.92	45
46	4745.28	4874.22	5007.62	5145.83	5289 25	5438.35	5593.64	5755.70	5925.22	6102.95	46
47	4747.39	4876.41	5009.88	5148.17	5291.69	5440.88	5596.28	5758.46	5928.11	6105.99	47
48	4749 51	4878.60	5012.15	5150.52	5294.13	5443.42	5598.93	5761.23	5931.00	6109.03	48
49	4751.63	4880.79	5014.41	5152.87	5296.57	5445.96	5601.57	5763.99	5933.90	6112.07	49
50	4753.74	4882.98	5016.68	5155.22	5299.01	5448.50	5604.22	5766.76	5936.80	6115.12	50
51	4755.86	4885.17	5018.94	5157.57	5301.45	5451.05	5606.87	5769.53	5939.70	6118.16	51
52	4757.98	4887.36	5021.21	5159.93	5303.90	5453.59	5609.53	5772.31	5942.61	6121.21	52
53	4760.10	4889.55	5023.48	5162.28	5306.34	5456.14	5612.18	5775.08	5945.51	6124.26	53
54	4762.23	4891.75	5025.76	5164.64	5308.79	5458.68	5614.84	5777.86	5948.42	6127.32	54
55	4764.35	4893.94	5028.03	5167.00	5311.24	5461.23	5617.50	5780.64	5951.33	6130.38	55
56	4766.47	4896.14	5030.30	5169.36	5313.69	5463.78	5620.16	5783.42	5954.24	6133.44	56
57	4768.60	4898.34	5032.58	5171.72	5316.15	5466.34	5622.82	5786.20	5957.16	6136.50	57
58	4770.73	4900.54	5034.86	5174.08	5318.60	5468.89	5625.49	5788.98	5960.08	6139.56	58
59	4772.86	4902.74	5037.14	5176.44	5321.06	5471.45	5628 15	5791.77	5963.00	6142.63	59
60	4774.98	4904.94	5039.42	5178.81	5323.51	5474.01	5630.82	5794.56	5965.92	6145.70	60
Lat.	61°	62°	63°	64°	65°	66°	67°	68°	69°	70°	

Meridional Parts.

Lat.	71°	72°	73°	74°	75°	76°	77°	78°	79°	80°	
0′	6145.70	6334.84	6534.42	6745.74	6970.34	7210.07	7467.21	7744.57	8045.71	8375.20	0′
1	6148.77	6338.08	6537.85	6749.37	6974.20	7214.20	7471.66	7749.38	8050.95	8380.96	1
2	6151.85	6341.32	6541.27	6753.01	6978.07	7218.35	7476.11	7754.20	8056.20	8386.73	2
3	6154.93	6344.56	6544.70	6756.64	6981.95	7222.49	7480.57	7759.02	8061.46	8392.52	3
4	6158.01	6347.81	6548.13	6760.28	6985.83	7226.64	7485.03	7763.86	8066.73	8398.31	4
5	6161.09	6351.06	6551.57	6763.93	6989.71	7230.80	7489.50	7768.70	8072.01	8404.11	5
6	6164.18	6354.31	6555.01	6767.58	6993.60	7234.96	7493.98	7773.55	8077.29	8409.92	6
7	6167.27	6357.56	6558.45	6771.23	6997.49	7239 12	7498.46	7778.40	8082.58	8415.74	7
8	6170.36	6360.82	6561.89	6774.89	7001.38	7243.29	7502.95	7783.26	8087.88	8421.57	8
9	6173.45	6364.08	6565.34	6778.55	7005.28	7247.47	7507.44	7788.12	8093.19	8427.42	9
10	6176.55	6367.35	6568.79	6782.21	7009.19	7251.65	7511.94	7793.00	8098.51	8433.27	10
11	6179.65	6370.61	6572.25	6785.88	7013.10	7255.83	7516.45	7797.88	8103.83	8439.13	11
12	6182.75	6373.88	6575.70	6789.55	7017.01	7260.02	7520.96	7802.76	8109.17	8445.00	12
13	6185.85	6377.16	6579.16	6793.22	7020.93	7264.22	7525.47	7807.66	8114.51	8450.88	13
14	6188.96	6380.43	6582.63	6796.90	7024.85	7268.42	7530.00	7812.56	8119.86	8456.77	14
15	6192.07	6383.71	6586.10	6800.58	7028.77	7272.62	7534.53	7817.46	8125.22	8462.67	15
16	6195.18	6386.99	6589.57	6804.27	7032.70	7276.83	7539.06	7822.38	8130.58	8468.58	16
17	6198.30	6390.28	6593.05	6807.96	7036.64	7281.05	7543.60	7827.30	8135.95	8474.50	17
18	6201.42	6393.57	6596.52	6811.65	7040.58	7285.27	7548.15	7832.23	8141.33	8480.43	18
19	6204.54	6396.86	6600.01	6815.35	7044.52	7289.49	7552.70	7837.16	8146.72	8486.37	19
20	6207.66	6400.15	6603.49	6819.05	7048 47	7293.72	7557.26	7842.10	8152.12	8492.32	20
21	6210.78	6403.44	6606.98	6822.75	7052.42	7297.96	7561.82	7847.05	8157.53	8498.28	21
22	6213.91	6406.74	6610.47	6826.46	7056.37	7302.20	7566.39	7852.01	8162.95	8504.25	22
23	6217.04	6410.05	6613.96	6830.18	7060.33	7306.44	7570.96	7856.97	8168.37	8510.23	23
24	6220.18	6413.35	6617.46	6833.89	7064.30	7310.69	7575.54	7861.94	8173.80	8516.22	24
25	6223.31	6416.66	6620.97	6837.61	7068.27	7314.95	7580.13	7866.91	8179.24	8522.22	25
26	6226.45	6419.97	6624.47	6841.34	7072.24	7319.21	7584.72	7871.90	8184.69	8528.23	26
27	6229.59	6423.29	6627.98	6845.07	7076.22	7323.47	7589.32	7876.89	8190.15	8534.26	27
28	6232.74	6426.61	6631 49	6848.80	7080.20	7327.74	7593.93	7881.89	8195.61	8540.29	28
29	6235.89	6429.93	6635.01	6852.53	7084.19	7332.02	7598.54	7886.89	8201.09	8546.33	29
30	6239.04	6433.25	6638.53	6856.27	7088.18	7336.30	7603.16	7891.91	8206.57	8552.38	30
31	6242.19	6436.58	6642.05	6860.02	7092.18	7340.55	7607.78	7896.93	8212.06	8558.45	31
32	6245.35	6439.91	6645.58	6863.77	7096.18	7344.88	7612.41	7901.95	8217.56	8564.52	32
33	6248.50	6443.24	6649.11	6867.52	7100.18	7349.18	7617.04	7906.98	8223.07	8570.61	33
34	6251.67	6446.58	6652.64	6871.27	7104.19	7353.48	7621.68	7912.03	8228.59	8576.70	34
35	6254.83	6449 92	6656.18	6875.03	7108.21	7357.79	7626.33	7917.08	8234.12	8582.81	35
36	6258.00	6453.26	6659.72	6878.80	7112.23	7362.10	7630.99	7922.13	8239.66	8588.93	36
37	6261.17	6456.61	6663.26	6882.56	7116.25	7366.42	7635.65	7927.19	8245.20	8595.06	37
38	6264.34	6459.95	6666.81	6886.34	7120.28	7370.74	7640.31	7932.26	8250.75	8601.20	38
39	6267.51	6463.31	6670.36	6890.11	7124.31	7375.07	7644.98	7937.34	8256.31	8607.35	39
40	6270.69	6466.66	6673.91	6893.89	7128.35	7379.40	7649.66	7942.43	8261.88	8613.51	40
41	6273.87	6470.02	6677.47	6897.68	7132.39	7383.74	7654.35	7947.52	8267.46	8619.68	41
42	6277.05	6473.38	6681.03	6901.46	7136.43	7388.08	7659.04	7952.62	8273.05	8625.86	42
43	6280.24	6476.74	6684.59	6905.25	7140.48	7392.43	7663.74	7957.72	8278.65	8632.05	43
44	6283.43	6480.11	6688.16	6909.05	7144.54	7396.79	7668.44	7962.84	8284.25	8638.26	44
45	6286.62	6483.48	6691.73	6912.85	7148.60	7401.15	7673.15	7967.96	8289.87	8644.47	45
46	6289.82	6486.86	6695.31	6916.65	7152.67	7405.51	7677.87	7973.09	8295.49	8650.70	46
47	6293.01	6490.23	6698.89	6920.46	7156.74	7409.88	7682.59	7978.23	8301.12	8656.94	47
48	6296.21	6493.61	6702.47	6924.27	7160.81	7414.26	7687.32	7983.37	8306.77	8663.19	48
49	6299.42	6497.00	6706.06	6928.09	7164.89	7418.64	7692.05	7988.52	8312.42	8669.45	49
50	6302.62	6500.38	6709.65	6931.91	7168.97	7423.03	7696.79	7993.68	8318.08	8675.72	50
51	6305.83	6503.77	6713.24	6935.73	7173.06	7427.42	7701.54	7998.85	8323.75	8682.00	51
52	6309.04	6507.17	6716.84	6939.56	7177.15	7431.82	7706.30	8004.03	8329.43	8688.29	52
53	6312.26	6510.56	6720.44	6943.40	7181.25	7436.22	7711.06	8009.21	8335.12	8694.60	53
54	6315.48	6513.96	6724.04	6947.23	7185.35	7440.63	7715.83	8014.40	8340.82	8700.92	54
55	6318.70	6517.36	6727.65	6951.07	7189.46	7445.05	7720.60	8019.60	8346.52	8707.25	55
56	6321.92	6520.77	6731.26	6954.92	7193.57	7449.47	7725.38	8024 81	8352.24	8713.59	56
57	6325.14	6524.18	6734.88	6958.77	7197.69	7453.89	7730.17	8030.02	8357.96	8719.94	57
58	6328.37	6527.59	6738.50	6962.62	7201.81	7458.33	7734.96	8035.24	8363.70	8726.30	58
59	6331.61	6531.01	6742.12	6966.48	7205.94	7462.76	7739.76	8040.47	8369.44	8732.68	59
60	6334.84	6534.42	6745.74	6970.34	7210.07	7467.21	7744.57	8045.71	8375.20	8739.06	60
Lat.	71°	72°	73°	74°	75°	76°	77°	78°	79°	80°	

Meridional Parts.

Lat.	81°	82°	83°	84°	85°	86°	87°	88°	89°	
0'	9139.06	9145.46	9605.82	10136.89	10764.62	11532.52	12522.11	13916.43	16299.56	0'
1	9745.46	9152.65	9614.03	10146.46	10776.11	11546.88	12541.27	13945.20	16357.34	1
2	9751.87	9159.86	9622.27	10156.07	10787.65	11561.31	12560.54	13974.22	16416.11	2
3	9758.29	9167.08	9630.52	10165.70	10799.22	11575.80	12579.91	14003.48	16475 90	3
4	9764.73	9174.32	9638.80	10175.37	10810.82	11590.34	12599.40	14033.00	16536.76	4
5	9771.17	9181.57	9647.09	10185.05	10822.47	11604.95	12619.00	14062.77	16598.69	5
6	9777.63	9188.84	9655.40	10194.77	10834.16	11619.62	12638.70	14092.80	16661.78	6
7	9784.10	9196.13	9663.74	10204.51	10845.89	11634.36	12658.53	14123.09	16726.04	7
8	9790.58	9203.42	9672.09	10214.28	10857.65	11649.16	12678.46	14153.66	16791.53	8
9	9797.08	9210.74	9680.47	10224.08	10869.46	11664.02	12698.52	14184.49	16858.29	9
10	9803.58	9218.07	9688.86	10233.90	10881.31	11678.94	12718.69	14215.61	16926.36	10
11	9810.10	9225.41	9697.28	10243.75	10893.20	11693.93	12738.98	14247.01	16995.81	11
12	9816.63	9232.77	9705.71	10253.64	10905.13	11708.99	12759.39	14278.70	17066 70	12
13	9823.17	9240.15	9714.17	10263.54	10917.10	11724.11	12779.92	14310.68	17139.09	13
14	9829.73	9247.54	9722.64	10273.48	10929.11	11739.30	12800.58	14342.97	17213.03	14
15	9836.30	9254.95	9731.14	10283.45	10941.17	11754.56	12821.36	14375.56	17288.57	15
16	9842.88	9262.37	9739.66	10293.45	10953.26	11769.88	12842.26	14408.46	17365.83	16
17	9849.47	9269.81	9748.20	10303.47	10965.40	11785.27	12863.30	14441.68	17444.87	17
18	9856.07	9277.27	9756.76	10313.53	10977.59	11800.73	12884.46	14475.23	17525.77	18
19	9862.69	9284.74	9765.34	10323.61	10989.81	11816.26	12905.75	14509.10	17608.63	19
20	9869.32	9292.23	9773.94	10333.72	11002.08	11831.87	12927.18	14543.31	17693.49	20
21	9875.96	9299.73	9782.57	10343.86	11014.40	11847.54	12948.74	14577.87	17780.53	21
22	9882.62	9307.25	9791.21	10354.03	11026.75	11863.28	12970.44	14612.78	17869.83	22
23	9889.29	9314.79	9799.88	10364.24	11039.15	11879.10	12992.27	14648.04	17961.51	23
24	9895.97	9322.34	9808.57	10374.47	11051.60	11894.99	13014.25	14683.67	18055.70	24
25	9902.66	9329.91	9817.28	10384.73	11064.09	11910.95	13036.36	14719.67	18152.55	25
26	9909.37	9337.49	9826.02	10395.03	11076.63	11926.99	13058.62	14756.05	18252.20	26
27	9916.09	9345.10	9834.77	10405.35	11089.21	11943.10	13081.02	14792.83	18354.83	27
28	9922.82	9352.72	9843.55	10415.71	11101.84	11959.29	13103.58	14830.00	18460.62	28
29	9929.57	9360.35	9852.35	10426.09	11114.52	11975.55	13126.27	14867.57	18569.76	29
30	9936.33	9368.00	9861.17	10436.51	11127.24	11991.89	13149.12	14905.56	18682.49	30
31	9943.10	9375.67	9870.02	10446.96	11140.01	12008.31	13172.13	14943.98	18799.03	31
32	9949.88	9383.36	9878.88	10457.44	11152.82	12024.81	13195.28	14982.83	18919.67	32
33	9956.68	9391.06	9887.77	10467.95	11165.69	12041.39	13218.60	15022.12	19044.69	33
34	9963.49	9398.79	9896.69	10478.50	11178.60	12058.05	13242.07	15061.87	19174.44	34
35	9970.32	9406.53	9905.63	10489.08	11191.56	12074.79	13265.70	15102.08	19309.27	35
36	9977.16	9414.28	9914.59	10499.69	11204.57	12091.60	13289.50	15142.77	19449.61	36
37	9984.01	9422.05	9923.57	10510.33	11217.63	12108.51	13313.47	15183.94	19595.92	37
38	9990.87	9429.84	9932.57	10521.01	11230.74	12125.49	13337.60	15225.62	19748.73	38
39	9997.75	9437.65	9941.60	10531.71	11243.90	12142.57	13361.90	15267.80	19908.66	39
40	9004.65	9445.48	9950.66	10542.45	11257.11	12159.72	13386.37	15310.51	20076.39	40
41	9011.55	9453.32	9959.73	10553.23	11270.37	12176.96	13411.02	15353.76	20252.72	41
42	9018.47	9461.18	9968.83	10564.04	11283.68	12194.29	13435.85	15397.56	20438.59	42
43	9025.41	9469.06	9977.96	10574.88	11297.04	12211.71	13460.86	15441.92	20635.09	43
44	9032.36	9476.96	9987.11	10585.76	11310.46	12229.21	13486.05	15486.86	20843.50	44
45	9039.32	9484.87	9996.28	10596.67	11323.93	12246.81	13511.43	15532.40	21065.37	45
46	9046.29	9492.81	10005.48	10607.62	11337.45	12264.49	13537.00	15578.55	21302.55	46
47	9053.28	9500.76	10014.70	10618.60	11351.02	12282.26	13562.75	15625.32	21557.31	47
48	9060.29	9508.73	10023.95	10629.61	11364.65	12300.13	13588 71	15672.75	21832.48	48
49	9067.31	9516.71	10033.22	10640.67	11378.33	12318.09	13614.85	15720.83	22131.60	49
50	9074.34	9524.72	10042.52	10651.75	11392.06	12336.15	13641.20	15769.59	22459.26	50
51	9081.39	9532.74	10051.84	10662.87	11405.85	12354.30	13667.75	15819.06	22821.46	51
52	9088.45	9540.79	10061.19	10674.03	11419.70	12372.54	13694.52	15869.25	23226.39	52
53	9095.52	9548.85	10070.56	10685.22	11433.60	12390.89	13721.48	15920.19	23685.42	53
54	9102.61	9556.93	10079.96	10696.46	11447.56	12409.33	13748.67	15971.89	24215.35	54
55	9109.72	9565.03	10089.38	10707.72	11461.58	12427.87	13776.07	16024.38	24842.12	55
56	9116.84	9573.15	10098.83	10719.03	11475.65	12446.51	13803.68	16077.68	25609.23	56
57	9123.97	9581.29	10108.30	10730.37	11489.78	12465.26	13831.53	16131.82	26598.21	57
58	9131.12	9589.45	10117.81	10741.75	11503.97	12484.10	13859.60	16186.83	27992.10	58
59	9138.28	9597.62	10127.33	10753.17	11518.21	12503.05	13887.90	16242.74	30374.96	59
60	9145.46	9605.82	10136.89	10764.62	11532.52	12522.11	13916.43	16299.56	Infin.	60
Lat.	81°	82°	83°	84°	85°	86°	87°	88°	89°	

Distance of objetts first seen at sea when eye on sea; if eye at known height above sea, add distance for that height.

Height, Ft.	Distance, Naut. Miles.	Height, Ft.	Distance, Naut. Miles.	Height, Ft.	Distance, Naut. Miles.	Height, Ft.	Distance, Naut. Miles.	Height, Ft.	Distance, Naut. Miles.	Height, Ft.	Distance, Naut. Miles.	Height, Ft.	Distance, Naut. Miles.	Height, Ft.	Distance, Naut. Miles.
1	1·15	22	5·40	43	7·54	120	12·60	300	19·91	520	26·22	940	35·25	2800	60·8
2	1·63	23	5·51	44	7·62	125	12·85	310	20·24	540	26·71	960	35·62	2900	61·9
3	1·99	24	5·63	45	7·70	130	13·11	320	20·57	560	27·21	980	35·99	3000	63·0
4	2·31	25	5·75	46	7·79	135	13·36	330	20·88	580	27·69	1000	36·40	3100	64·1
5	2·58	26	5·87	47	7·88	140	13·60	340	21·20	600	28·17	1100	38·10	3200	65·0
6	2·82	27	5·98	48	7·97	145	13·84	350	21·51	620	28·62	1200	39·90	3300	66·0
7	3·04	28	6·08	49	8·05	150	14·08	360	21·81	640	29·09	1300	41·40	3400	67·0
8	3·25	29	6·19	50	8·12	160	14·54	370	22·12	660	29·54	1400	43·00	3500	68·0
9	3·45	30	6·30	55	8·52	170	14·99	380	22·41	680	29·98	1500	44·50	3600	69·0
10	3·64	31	6·41	60	8·91	180	15·43	390	22·71	700	30·42	1600	46·00	3700	69·9
11	3·81	32	6·50	65	9·27	190	15·85	400	22·99	720	30·85	1700	47·40	3800	70·9
12	3·99	33	6·60	70	9·62	200	16·26	410	23·28	740	31·28	1800	48·80	3900	71·8
13	4·14	34	6·70	75	9·96	210	16·66	420	23·56	760	31·70	1900	50·20	4000	72·7
14	4·30	35	6·80	80	10·28	220	17·05	430	23·84	780	32·11	2000	51·50	4100	73·6
15	4·45	36	6·90	85	10·60	230	17·43	440	24·12	800	32·52	2100	52·70	4200	74·5
16	4·60	37	6·99	90	10·90	240	17·81	450	24·39	820	32·92	2200	54·00	4300	75·4
17	4·74	38	7·09	95	11·20	250	18·16	460	24·65	840	33·32	2300	55·10	4400	76·2
18	4·88	39	7·18	100	11·50	260	18·54	470	24·93	860	33·72	2400	56·30	4500	77·0
19	5·02	40	7·27	105	11·79	270	18·90	480	25·18	880	34·11	2500	57·50	4600	77·9
20	5·15	41	7·36	110	12·06	280	19·24	490	25·45	900	34·49	2600	58·70	4700	78·8
21	5·27	42	7·45	115	12·34	290	19·58	500	25·70	920	34·88	2700	59·80	1 mile	83·5

TABLE 9.

Dip of the Sea Horizon.

Height of eye.	Dip.	Height of eye.	Dip.	Height of eye.	Dip.	Height of eye.	Dip.	Height of eye.	Dip.
Ft.	′ ″	Ft.	′ ″	Ft.	′ ″	Ft.	′ ″	Ft.	′ ″
1	0 59	15	3 49	29	5 18	59	7 34	110	10 19
2	1 24	16	3 56	30	5 24	62	7 45	120	10 47
3	1 42	17	4 4	31	5 29	65	7 56	130	11 14
4	1 58	18	4 11	32	5 34	68	8 7	140	11 39
5	2 12	19	4 17	33	5 39	71	8 18	150	12 3
6	2 25	20	4 24	34	5 44	74	8 28	160	12 27
7	2 36	21	4 31	35	5 49	77	8 38	170	12 50
8	2 47	22	4 37	38	6 4	80	8 48	180	13 12
9	2 57	23	4 43	41	6 18	83	8 58	190	13 33
10	3 7	24	4 49	44	6 32	86	9 8	200	13 55
11	3 16	25	4 55	47	6 45	89	9 17	210	14 16
12	3 25	26	5 1	50	6 58	92	9 26	220	14 36
13	3 33	27	5 7	53	7 10	95	9 36	230	14 56
14	3 41	28	5 13	56	7 22	98	9 45	240	15 15

TABLE 10.

Dip of a Shore Horizon.

Distance of the Shore.	Height of the eye above the Sea in feet.							
	5	10	15	20	25	30	35	40
Miles	′	′	′	′	′	′	′	′
¼	11	23	34	45	57	68	79	91
½	6	12	17	23	28	34	40	45
¾	4	8	12	15	19	23	27	30
1	3	6	9	12	15	17	20	23
1¼	3	5	7	10	12	14	16	19
1½	3	4	6	8	10	12	14	16
2	2	4	5	7	8	10	11	12
2½	2	3	4	6	7	8	9	10
3	2	3	4	5	6	7	8	9
3½	2	3	4	5	6	6	7	8
4	2	3	4	5	5	6	7	7
5	2	3	4	4	5	6	6	7
6	2	3	4	4	5	5	6	6

Distance of an Object by Two Bearings.

Difference between the Course and Second Bearing. *Points.*	*Difference between the Course and First Bearing. Points.*											
	2		2½		3		3½		4		4½	
3	1·96	1·09										
3½	1·32	0·84	2·42	1·53								
4	1·00	0·71	1·62	1·15	2·35	2·01						
4½	0·81	0·63	1·23	0·95	1·91	1·48	3·25	2·51				
5	0·69	0·57	1·00	0·83	1·45	1·21	2·19	1·82	3·62	3·01		
5½	0·60	0·53	0·85	0·75	1·18	1·04	1·66	1·46	2·44	2·15	3·96	3·49
6	0·54	0·50	0·74	0·69	1·00	0·92	1·35	1·24	1·85	1·71	2·66	2·46
6½	0·50	0·47	0·67	0·64	0·88	0·84	1·14	1·09	1·50	1·44	2·02	1·93
7	0·46	0·45	0·61	0·60	0·79	0·77	1·00	0·98	1·27	1·25	1·64	1·61
7½	0·43	0·43	0·57	0·56	0·72	0·72	0·90	0·89	1·11	1·11	1·39	1·38
8	0·41	0·41	0·53	0·53	0·67	0·67	0·82	0·82	1·00	1·00	1·22	1·22
8½	0·40	0·40	0·51	0·51	0·63	0·63	0·76	0·76	0·91	0·91	1·09	1·09
9	0·39	0·38	0·49	0·48	0·60	0·59	0·72	0·71	0·85	0·83	1·00	0·98
9½	0·38	0·37	0·48	0·46	0·58	0·56	0·69	0·66	0·80	0·77	0·93	0·89
10	0·38	0·35	0·47	0·44	0·57	0·52	0·66	0·61	0·77	0·71	0·88	0·81
10½	0·38	0·34	0·47	0·42	0·56	0·49	0·65	0·57	0·74	0·65	0·84	0·74
11	0·39	0·32	0·47	0·39	0·56	0·46	0·64	0·53	0·72	0·60	0·81	0·67
11½	0·40	0·31	0·48	0·37	0·56	0·43	0·63	0·49	0·71	0·55	0·79	0·61
12	0·41	0·29	0·49	0·35	0·57	0·40	0·64	0·45	0·71	0·50	0·78	0·55
12½	0·43	0·28	0·51	0·32	0·58	0·37	0·65	0·41	0·71	0·45	0·77	0·49
13	0·46	0·26	0·53	0·30	0·60	0·33	0·66	0·37	0·72	0·40	0·78	0·43
13½	0·50	0·23	0·57	0·27	0·63	0·30	0·69	0·32	0·74	0·35	0·79	0·37
14	0·54	0·21	0·61	0·23	0·67	0·26	0·72	0·28	0·77	0·29	0·81	0·31
	5		5½		6		6½		7		7½	
6	4·26	3·94										
6½	2·86	2·74	4·52	4·33								
7	2·17	2·13	3·04	2·98	4·74	4·64						
7½	1·76	1·76	2·30	2·29	3·18	3·17	4·91	4·88				
8	1·50	1·50	1·87	1·87	2·41	2·41	3·30	3·30	5·03	5·03		
8½	1·31	1·30	1·59	1·58	1·96	1·95	2·50	2·49	3·38	3·36	5·10	5·08
9	1·18	1·15	1·39	1·36	1·66	1·63	2·03	1·99	2·56	2·51	3·43	3·36
9½	1·08	1·03	1·25	1·19	1·46	1·39	1·72	1·65	2·08	1·99	2·60	2·49
10	1·00	0·92	1·14	1·05	1·31	1·21	1·51	1·39	1·77	1·63	2·11	1·95
10½	0·94	0·83	1·06	0·94	1·20	1·05	1·35	1·19	1·55	1·36	1·79	1·58
11	0·90	0·75	1·00	0·83	1·11	0·92	1·24	1·03	1·39	1·15	1·57	1·30
11½	0·87	0·67	0·95	0·73	1·05	0·81	1·15	0·89	1·27	0·98	1·41	1·09
12	0·85	0·60	0·92	0·65	1·00	0·71	1·09	0·77	1·18	0·83	1·29	0·91
12½	0·84	0·53	0·90	0·57	0·97	0·61	1·04	0·66	1·11	0·71	1·20	0·76
13	0·83	0·46	0·89	0·49	0·94	0·52	1·00	0·56	1·06	0·59	1·13	0·63
13½	0·84	0·39	0·88	0·42	0·93	0·44	0·98	0·46	1·02	0·48	1·08	0·51
14	0·85	0·32	0·89	0·34	0·92	0·35	0·90	0·37	1·00	0·38	1·04	0·40
	8		8½		9		9½		10		10½	
9	5·13	5·03										
9½	3·44	3·30	5·10	4·88								
10	2·61	2·41	3·43	3·17	5·03	4·64						
10½	2·12	1·87	2·60	2·29	3·38	2·98	4·91	4·33				
11	1·80	1·50	2·11	1·76	2·56	2·13	3·30	2·74	4·74	3·94		
11½	1·58	1·22	1·79	1·38	2·08	1·61	2·50	1·93	3·18	2·46	4·52	3·49
12	1·41	1·00	1·57	1·11	1·77	1·25	2·03	1·44	2·41	1·71	3·04	2·15
12½	1·29	0·82	1·41	0·89	1·55	0·98	1·72	1·09	1·96	1·24	2·30	1·46
13	1·20	0·67	1·29	0·72	1·39	0·77	1·51	0·84	1·66	0·92	1·87	1·04
13½	1·13	0·53	1·20	0·56	1·27	0·60	1·35	0·64	1·46	0·69	1·59	0·75
14	1·08	0·41	1·13	0·43	1·18	0·45	1·24	0·47	1·31	0·50	1·39	0·53
	11		11½		12		12½		13			
12	4·26	3·01										
12½	2·86	1·82	3·96	2·51								
13	2·17	1·21	2·66	1·48	3·62	2·01						
13½	1·76	0·83	2·02	0·95	2·44	1·15	3·25	1·53				
14	1·50	0·57	1·64	0·63	1·85	0·71	2·19	0·84	2·85	1·09		

(Ther. 50.)
(Bar. 30.)

Correction of a Star's App. Alt. *(subtr.)*

(or Refraction in Alt.)

AA	Corr. —	Diff. for 10′	AA	Corr. —	AA	Corr. —	AA	Corr. —	AA	Corr. —	AA	Corr. —
° ′	′ ″	″	° ′	′ ″	° ′	′ ″	° ′	′ ″	° ′	′ ″	° ′	′ ″
0 0	33 51	117	5 0	9 58	6 0	8 32	7 0	7 27	8 0	6 35	9 0	5 54
0 5	32 53	113	5 1	9 56	6 1	8 31	7 1	7 26	8 1	6 34	9 2	5 53
0 10	31 58	109	5 2	9 55	6 2	8 30	7 2	7 25	8 2	6 34	9 4	5 51
0 15	31 5	105	5 3	9 53	6 3	8 28	7 3	7 24	8 3	6 33	9 6	5 50
0 20	30 13	101	5 4	9 52	6 4	8 27	7 4	7 23	8 4	6 32	9 8	5 48
0 25	29 24	97	5 5	9 50	6 5	8 26	7 5	7 22	8 5	6 31	9 10	5 47
0 30	28 37	94	5 6	9 48	6 6	8 25	7 6	7 21	8 6	6 31	9 12	5 46
0 35	27 51	90	5 7	9 47	6 7	8 24	7 7	7 20	8 7	6 30	9 14	5 45
0 40	27 6	87	5 8	9 45	6 8	8 22	7 8	7 19	8 8	6 29	9 16	5 43
0 45	26 24	84	5 9	9 44	6 9	8 21	7 9	7 18	8 9	6 29	9 18	5 42
0 50	25 43	80	5 10	9 42	6 10	8 20	7 10	7 17	8 10	6 28	9 20	5 41
0 55	25 3	77	5 11	9 40	6 11	8 19	7 11	7 16	8 11	6 27	9 22	5 40
1 0	24 25	74	5 12	9 39	6 12	8 18	7 12	7 15	8 12	6 27	9 24	5 39
1 5	23 48	71	5 13	9 37	6 13	8 17	7 13	7 14	8 13	6 26	9 26	5 38
1 10	23 13	69	5 14	9 36	6 14	8 16	7 14	7 13	8 14	6 25	9 28	5 37
1 15	22 40	66	5 15	9 34	6 15	8 14	7 15	7 12	8 15	6 24	9 30	5 36
1 20	22 8	63	5 16	9 33	6 16	8 13	7 16	7 12	8 16	6 24	9 32	5 35
1 25	21 37	61	5 17	9 31	6 17	8 12	7 17	7 11	8 17	6 23	9 34	5 34
1 30	21 7	59	5 18	9 30	6 18	8 11	7 18	7 10	8 18	6 22	9 36	5 32
1 35	20 38	57	5 19	9 28	6 19	8 10	7 19	7 9	8 19	6 22	9 38	5 31
1 40	20 10	55	5 20	9 27	6 20	8 9	7 20	7 8	8 20	6 21	9 40	5 30
1 45	19 43	53	5 21	9 25	6 21	8 8	7 21	7 7	8 21	6 20	9 42	5 29
1 50	19 17	51	5 22	9 24	6 22	8 7	7 22	7 6	8 22	6 20	9 44	5 28
1 55	18 52	49	5 23	9 22	6 23	8 6	7 23	7 5	8 23	6 19	9 46	5 27
2 0	18 29	48	5 24	9 21	6 24	8 5	7 24	7 4	8 24	6 18	9 48	5 26
2 5	18 5	46	5 25	9 19	6 25	8 3	7 25	7 3	8 25	6 17	9 50	5 25
2 10	17 43	44	5 26	9 17	6 26	8 2	7 26	7 3	8 26	6 17	9 52	5 24
2 15	17 21	43	5 27	9 16	6 27	8 1	7 27	7 2	8 27	6 16	9 54	5 23
2 20	17 0	41	5 28	9 14	6 28	8 0	7 28	7 1	8 28	6 15	9 56	5 22
2 25	16 40	40	5 29	9 13	6 29	7 59	7 29	7 0	8 29	6 15	9 58	5 21
2 30	16 21	39	5 30	9 11	6 30	7 58	7 30	6 59	8 30	6 14	10 0	5 20
2 35	16 2	37	5 31	9 10	6 31	7 57	7 31	6 58	8 31	6 13	10 2	5 19
2 40	15 43	36	5 32	9 8	6 32	7 56	7 32	6 57	8 32	6 13	10 4	5 18
2 45	15 25	35	5 33	9 7	6 33	7 55	7 33	6 57	8 33	6 12	10 6	5 17
2 50	15 8	34	5 34	9 6	6 34	7 54	7 34	6 56	8 34	6 11	10 8	5 16
2 55	14 51	33	5 35	9 4	6 35	7 52	7 35	6 55	8 35	6 10	10 10	5 15
3 0	14 35	32	5 36	9 3	6 36	7 51	7 36	6 54	8 36	6 10	10 12	5 14
3 5	14 19	31	5 37	9 2	6 37	7 50	7 37	6 53	8 37	6 9	10 14	5 13
3 10	14 4	30	5 38	9 1	6 38	7 49	7 38	6 53	8 38	6 8	10 16	5 12
3 15	13 50	29	5 39	8 59	6 39	7 48	7 39	6 52	8 39	6 8	10 18	5 11
3 20	13 35	28	5 40	8 58	6 40	7 47	7 40	6 51	8 40	6 7	10 20	5 10
3 25	13 21	27	5 41	8 57	6 41	7 46	7 41	6 50	8 41	6 6	10 22	5 9
3 30	13 7	27	5 42	8 55	6 42	7 45	7 42	6 49	8 42	6 6	10 24	5 8
3 35	12 53	26	5 43	8 54	6 43	7 44	7 43	6 49	8 43	6 5	10 26	5 7
3 40	12 41	25	5 44	8 53	6 44	7 43	7 44	6 48	8 44	6 4	10 28	5 6
3 45	12 28	24	5 45	8 51	6 45	7 42	7 45	6 47	8 45	6 3	10 30	5 5
3 50	12 16	24	5 46	8 50	6 46	7 41	7 46	6 46	8 46	6 3	10 32	5 4
3 55	12 3	23	5 47	8 49	6 47	7 40	7 47	6 45	8 47	6 2	10 34	5 3
4 0	11 52	22	5 48	8 48	6 48	7 39	7 48	6 45	8 48	6 1	10 36	5 2
4 5	11 41	21	5 49	8 46	6 49	7 38	7 49	6 44	8 49	6 1	10 38	5 1
4 10	11 30	20	5 50	8 45	6 50	7 37	7 50	6 43	8 50	6 0	10 40	5 0
4 15	11 20	20	5 51	8 44	6 51	7 36	7 51	6 42	8 51	5 59	10 42	4 59
4 20	11 10	20	5 52	8 42	6 52	7 35	7 52	6 41	8 52	5 59	10 44	4 58
4 25	11 0	19	5 53	8 41	6 53	7 34	7 53	6 41	8 53	5 58	10 46	4 58
4 30	10 50	18	5 54	8 40	6 54	7 33	7 54	6 40	8 54	5 58	10 48	4 57
4 35	10 41	18	5 55	8 38	6 55	7 32	7 55	6 39	8 55	5 57	10 50	4 56
4 40	10 32	17	5 56	8 37	6 56	7 31	7 56	6 38	8 56	5 56	10 52	4 55
4 45	10 23	17	5 57	8 36	6 57	7 30	7 57	6 37	8 57	5 56	10 54	4 54
4 50	10 15	17	5 58	8 35	6 58	7 29	7 58	6 37	8 58	5 55	10 56	4 53
4 55	10 7	16	5 59	8 33	6 59	7 28	7 59	6 36	8 59	5 55	10 58	4 52

(Ther. 50.)
(Bar. 30.)

* Correction of a Star's App. Alt. *(subtr.)*

(or Refraction in Alt.)

AA	Corr. —	AA	Corr. —	AA	Corr. —	AA	Corr. —	AA	Corr. —	AA	Corr. —
° ′	′ ″	° ′	′ ″	° ′	′ ″	° ′	′ ″	° ′	′ ″	° ′	′ ″
11 0	4 51	13 0	4 7	15 0	3 34	20 0	2 39	30 0	1 40	50 0	0 49
11 2	4 50	13 2	4 7	15 5	3 33	20 10	2 37	30 20	1 39	50 30	0 48
11 4	4 49	13 4	4 6	15 10	3 32	20 20	2 36	30 40	1 38	51 0	0 47
11 6	4 49	13 6	4 6	15 15	3 31	20 30	2 35	31 0	1 37	51 30	0 46
11 8	4 48	13 8	4 5	15 20	3 30	20 40	2 33	31 20	1 35	52 0	0 45
11 10	4 47	13 10	4 4	15 25	3 28	20 50	2 32	31 40	1 34	52 30	0 45
11 12	4 46	13 12	4 4	15 30	3 27	21 0	2 30	32 0	1 33	53 0	0 44
11 14	4 45	13 14	4 3	15 35	3 26	21 10	2 29	32 20	1 32	53 30	0 43
11 16	4 45	13 16	4 3	15 40	3 25	21 20	2 28	32 40	1 31	54 0	0 42
11 18	4 44	13 18	4 2	15 45	3 24	21 30	2 27	33 0	1 29	54 30	0 41
11 20	4 43	13 20	4 1	15 50	3 23	21 40	2 26	33 20	1 28	55 0	0 41
11 22	4 42	13 22	4 1	15 55	3 22	21 50	2 24	33 40	1 27	55 30	0 40
11 24	4 41	13 24	4 0	16 0	3 21	22 0	2 23	34 0	1 26	56 0	0 39
11 26	4 41	13 26	4 0	16 5	3 20	22 10	2 22	34 20	1 25	56 30	0 38
11 28	4 40	13 28	3 59	16 10	3 18	22 20	2 21	34 40	1 24	57 0	0 38
11 30	4 39	13 30	3 58	16 15	3 17	22 30	2 20	35 0	1 23	57 30	0 37
11 32	4 38	13 32	3 58	16 20	3 16	22 40	2 19	35 20	1 22	58 0	0 36
11 34	4 37	13 34	3 57	16 25	3 15	22 50	2 18	35 40	1 21	58 30	0 36
11 36	4 37	13 36	3 57	16 30	3 14	23 0	2 16	36 0	1 20	59 0	0 35
11 38	4 36	13 38	3 56	16 35	3 13	23 10	2 15	36 20	1 19	59 30	0 34
11 40	4 35	13 40	3 55	16 40	3 12	23 20	2 14	36 40	1 18	60 0	0 34
11 42	4 34	13 42	3 55	16 45	3 11	23 30	2 13	37 0	1 17	60 30	0 33
11 44	4 33	13 44	3 54	16 50	3 10	23 40	2 12	37 20	1 16	61 0	0 32
11 46	4 33	13 46	3 54	16 55	3 9	23 50	2 11	37 40	1 15	61 30	0 32
11 48	4 32	13 48	3 53	17 0	3 8	24 0	2 10	38 0	1 14	62 0	0 31
11 50	4 31	13 50	3 53	17 5	3 7	24 10	2 9	38 20	1 13	62 30	0 30
11 52	4 30	13 52	3 52	17 10	3 7	24 20	2 8	38 40	1 13	63 0	0 30
11 54	4 30	13 54	3 51	17 15	3 6	24 30	2 7	39 0	1 12	63 30	0 29
11 56	4 29	13 56	3 51	17 20	3 5	24 40	2 6	39 20	1 11	64 0	0 28
11 58	4 29	13 58	3 50	17 25	3 4	24 50	2 5	39 40	1 10	64 30	0 28
12 0	4 28	14 0	3 50	17 30	3 3	25 0	2 4	40 0	1 9	65 0	0 27
12 2	4 27	14 2	3 49	17 35	3 2	25 10	2 3	40 20	1 8	65 30	0 26
12 4	4 27	14 4	3 49	17 40	3 1	25 20	2 2	40 40	1 8	66 0	0 26
12 6	4 26	14 6	3 48	17 45	3 0	25 30	2 1	41 0	1 7	66 30	0 25
12 8	4 25	14 8	3 48	17 50	2 59	25 40	2 1	41 20	1 6	67 0	0 25
12 10	4 24	14 10	3 47	17 55	2 58	25 50	2 0	41 40	1 5	67 30	0 24
12 12	4 24	14 12	3 47	18 0	2 58	26 0	1 59	42 0	1 5	68 0	0 23
12 14	4 23	14 14	3 46	18 5	2 57	26 10	1 58	42 20	1 4	69 0	0 22
12 16	4 22	14 16	3 45	18 10	2 56	26 20	1 57	42 40	1 3	70 0	0 21
12 18	4 21	14 18	3 45	18 15	2 55	26 30	1 56	43 0	1 2	71 0	0 20
12 20	4 21	14 20	3 44	18 20	2 54	26 40	1 55	43 20	1 2	72 0	0 19
12 22	4 20	14 22	3 44	18 25	2 53	26 50	1 55	43 40	1 1	73 0	0 18
12 24	4 19	14 24	3 43	18 30	2 53	27 0	1 54	44 0	1 0	74 0	0 17
12 26	4 19	14 26	3 43	18 35	2 52	27 10	1 53	44 20	1 0	75 0	0 15
12 28	4 18	14 28	3 42	18 40	2 51	27 20	1 52	44 40	0 59	76 0	0 14
12 30	4 17	14 30	3 42	18 45	2 50	27 30	1 51	45 0	0 58	77 0	0 13
12 32	4 17	14 32	3 41	18 50	2 49	27 40	1 51	45 20	0 57	78 0	0 12
12 34	4 16	14 34	3 41	18 55	2 48	27 50	1 50	45 40	0 57	79 0	0 11
12 36	4 15	14 36	3 40	19 0	2 48	28 0	1 49	46 0	0 56	80 0	0 10
12 38	4 15	14 38	3 40	19 5	2 47	28 10	1 48	46 20	0 55	81 0	0 9
12 40	4 14	14 40	3 39	19 10	2 46	28 20	1 48	46 40	0 55	82 0	0 8
12 42	4 13	14 42	3 39	19 15	2 45	28 30	1 47	47 0	0 54	83 0	0 7
12 44	4 13	14 44	3 38	19 20	2 45	28 40	1 46	47 20	0 53	84 0	0 6
12 46	4 12	14 46	3 38	19 25	2 44	28 50	1 45	47 40	0 53	85 0	0 5
12 48	4 11	14 48	3 37	19 30	2 43	29 0	1 45	48 0	0 52	86 0	0 4
12 50	4 11	14 50	3 37	19 35	2 42	29 10	1 44	48 20	0 52	87 0	0 3
12 52	4 10	14 52	3 36	19 40	2 42	29 20	1 43	48 40	0 51	88 0	0 2
12 54	4 9	14 54	3 36	19 45	2 41	29 30	1 43	49 0	0 50	89 0	0 1
12 56	4 9	14 56	3 35	19 50	2 40	29 40	1 42	49 20	0 50	90 0	0 0
12 58	4 8	14 58	3 35	19 55	2 39	29 50	1 41	49 40	0 49		

For Correction of the Mean Refraction.

Thermometer 50°, and Barometer 30 inches.

App. Alt.	Thermometer (Additive). 5°	10°	15°	20°	25°	30°	35°	40°	45°	50°	Barometer (Subtractive). 28·0	28·5	29·0	29·5	30·0	App. Alt.
4° 0′	76″	68″	59″	51″	42″	34″	25″	17″	8″	0″	48″	36″	24″	12″	0″	4° 0′
4 20	72	64	56	48	40	32	24	16	8		46	35	23	12		4 20
4 40	67	60	52	45	37	30	22	15	7		44	33	22	11		4 40
5 0	62	55	48	41	34	28	21	14	7	0	40	30	20	11	0	5 0
5 20	58	52	45	39	32	26	19	13	6		38	28	19	10		5 20
5 40	54	48	42	36	30	24	18	12	6		36	27	18	9		5 40
6 0	52	46	40	34	29	23	17	11	6	0	34	26	17	9	0	6 0
6 30	49	44	38	33	27	22	16	11	5		32	24	16	8		6 30
7 0	44	39	34	29	24	20	15	9	5		30	22	15	8		7 0
7 30	41	36	32	27	22	18	14	9	5	0	28	21	14	7	0	7 30
8°	38	34	30	25	21	17	13	8	4		27	20	13	7		8°
9	34	30	27	23	19	15	12	8	4		24	18	12	6		9
10	32	28	25	21	18	14	11	7	4	0	22	16	11	6	0	10
11	27	24	21	18	16	12	9	6	3		20	15	10	5		11
12	25	22	20	17	14	11	8	5	3		18	13	9	5		12
13	23	20	18	15	13	10	8	5	3		17	12	9	4	0	13
14	21	19	16	14	12	9	7	5	2	0	15	11	8	4		14
15	20	18	15	13	11	9	7	4	2		14	11	7	4		15
16	18	16	14	12	10	8	6	4	2		13	10	7	3	0	16
17	17	15	14	12	10	8	6	4	2	0	13	9	6	3		17
18	16	14	13	11	9	7	5	4	2		12	9	6	3		18
19	15	14	12	10	8	7	5	3	2		11	8	6	3	0	19
20	14	13	11	10	8	6	5	3	2	0	11	8	5	3		20
22	13	12	10	9	7	6	4	3	1		10	7	5	3		22
24	12	11	9	8	6	5	4	3	1		9	7	4	2	0	24
26	11	10	8	7	6	5	4	2	1	0	8	6	4	2		26
28	10	9	8	7	5	4	4	2	1		7	5	4	2		28
30	9	8	7	6	5	4	3	2	1		7	5	3	2	0	30
35	8	7	6	5	4	3	3	2	1	0	6	4	3	2		35
40	6	6	5	4	4	3	2	1	1		5	3	2	1		40
45	5	5	4	4	3	2	2	1	0		4	3	2	1	0	45
50	4	4	4	3	3	2	1	1	0	0	3	2	2	1		50
60	3	3	2	2	2	1	1	1	0		2	2	1	0		60
70	2	2	1	1	1	0	0	0	0	0	1	1	1	0	0	70
App. Alt.	95°	90°	85°	80°	75°	70°	65°	60°	55°	50°		31·5	31·0	30·5	30·0	App. Alt.
	Subtractive.											Additive.				

TABLE 14.

Sun's Par. in Alt.

Alt.	Par.
	+
°	″
0	8·8
12	8·6
18	8·4
21	8·2
24	8·0
27	7·8
30	7·6
33	7·4
36	7·1
39	6·8
42	6·5
45	6·2
48	5·9
51	5·5
54	5·2
57	4·8
60	4·4
63	4·0
66	3·6
69	3·1
72	2·7
75	2·3
78	1·8
81	1·4
84	0·9
87	0·4

TABLE 15.

Explanation of Symbols and Abbreviations used in Astronomy and Nautical Surveying.

☉ The Sun.
☾ The Moon.
☿ Mercury.
♀ Venus.

⊖ or ♁ The Earth.
♂ Mars.
♃ Jupiter.
♄ Saturn.

♅ Uranus.
♆ Neptune.
☌ Conjunction.
□ Quadrature.

☍ Opposition.
☊ Ascending Node.
☋ Descending Node.

h Hours.
m Minutes of Time.

s Seconds of Time.
° Degrees.

′ Minutes of Arc.
″ Seconds of Arc.

N. North. S. South.
E. East. W. West.

Signs of the Zodiac.

0. ♈ Aries.
I. ♉ Taurus.
II. ♊ Gemini.
III. ♋ Cancer.
IV. ♌ Leo.
V. ♍ Virgo.
VI. ♎ Libra.
VII. ♏ Scorpio.
VIII. ♐ Sagittarius
IX. ♑ Capricornus.
X. ♒ Aquarius.
XI. ♓ Pisces.

Objects in line (termed transit) ⌀.
Station, where angles are taken △.
Zero, from which angles are measured ⊕.
Single altitude of sun's lower limb ⊙.
Double " " " upper " $\overline{⊙}$.
Double " " " lower limb in artificial horizon $\underline{⊙}$.

Double altitude of sun's upper limb in artificial horizon $\overline{\overline{⊙}}$.
Sun's right limb ⊙|. Sun's left limb |⊙.
Sun's centre ◑ or ⊖.
Right extreme as of an island →.
Left " " " ←.
Current ⟹. Flood stream ⟿. Ebb stream ⇢.

(Ther. 50.)
(Bar. 30.)

Correction of the Sun's App. Alt. *(subtr.)* ⊙

(or Refraction — Parallax.)

AA	Corr. —	Diff. for 10′	AA	Corr. —	AA	Corr. —	AA	Corr. —	AA	Corr. —	AA	Corr. —
° ′	′ ″	″	° ′	′ ″	° ′	′ ″	° ′	′ ″	° ′	′ ″	° ′	′ ″
0 0	33 42	117	5 0	9 49	6 0	8 23	7 0	7 18	8 0	6 26	9 0	5 45
0 5	32 44	113	5 1	9 48	6 1	8 22	7 1	7 17	8 1	6 25	9 2	5 44
0 10	31 48	109	5 2	9 46	6 2	8 21	7 2	7 16	8 2	6 25	9 4	5 42
0 15	30 56	105	5 3	9 44	6 3	8 20	7 3	7 15	8 3	6 24	9 6	5 41
0 20	30 4	101	5 4	9 43	6 4	8 18	7 4	7 14	8 4	6 23	9 8	5 40
0 25	29 15	97	5 5	9 41	6 5	8 17	7 5	7 13	8 5	6 23	9 10	5 38
0 30	28 28	94	5 6	9 40	6 6	8 16	7 6	7 12	8 6	6 22	9 12	5 37
0 35	27 42	90	5 7	9 38	6 7	8 15	7 7	7 11	8 7	6 21	9 14	5 36
0 40	26 57	87	5 8	9 36	6 8	8 14	7 8	7 10	8 8	6 21	9 16	5 35
0 45	26 15	84	5 9	9 35	6 9	8 13	7 9	7 9	8 9	6 20	9 18	5 33
0 50	25 34	80	5 10	9 33	6 10	8 11	7 10	7 8	8 10	6 19	9 20	5 32
0 55	24 54	77	5 11	9 32	6 11	8 10	7 11	7 7	8 11	6 19	9 22	5 31
1 0	24 16	74	5 12	9 31	6 12	8 9	7 12	7 6	8 12	6 18	9 24	5 30
1 5	23 39	71	5 13	9 29	6 13	8 8	7 13	7 6	8 13	6 17	9 26	5 29
1 10	23 4	69	5 14	9 27	6 14	8 7	7 14	7 5	8 14	6 16	9 28	5 28
1 15	22 31	66	5 15	9 26	6 15	8 6	7 15	7 4	8 15	6 16	9 30	5 27
1 20	21 59	63	5 16	9 24	6 16	8 5	7 16	7 3	8 16	6 15	9 32	5 26
1 25	21 28	61	5 17	9 23	6 17	8 4	7 17	7 2	8 17	6 14	9 34	5 25
1 30	20 58	59	5 18	9 21	6 18	8 2	7 18	7 1	8 18	6 14	9 36	5 24
1 35	20 29	57	5 19	9 20	6 19	8 1	7 19	7 0	8 19	6 13	9 38	5 22
1 40	20 1	55	5 20	9 18	6 20	8 0	7 20	6 59	8 20	6 12	9 40	5 21
1 45	19 34	53	5 21	9 17	6 21	7 59	7 21	6 58	8 21	6 12	9 42	5 20
1 50	19 8	51	5 22	9 15	6 22	7 58	7 22	6 57	8 22	6 11	9 44	5 19
1 55	18 43	49	5 23	9 13	6 23	7 57	7 23	6 57	8 23	6 10	9 46	5 18
2 0	18 20	48	5 24	9 12	6 24	7 56	7 24	6 56	8 24	6 9	9 48	5 17
2 5	17 56	46	5 25	9 10	6 25	7 55	7 25	6 55	8 25	6 9	9 50	5 16
2 10	17 34	44	5 26	9 9	6 26	7 54	7 26	6 54	8 26	6 8	9 52	5 15
2 15	17 12	43	5 27	9 7	6 27	7 53	7 27	6 53	8 27	6 7	9 54	5 14
2 20	16 51	41	5 28	9 5	6 28	7 51	7 28	6 52	8 28	6 7	9 56	5 13
2 25	16 31	40	5 29	9 4	6 29	7 50	7 29	6 51	8 29	6 6	9 58	5 12
2 30	16 12	39	5 30	9 2	6 30	7 49	7 30	6 50	8 30	6 5	10 0	5 11
2 35	15 53	37	5 31	9 1	6 31	7 48	7 31	6 49	8 31	6 5	10 2	5 10
2 40	15 34	36	5 32	9 0	6 32	7 47	7 32	6 49	8 32	6 4	10 4	5 9
2 45	15 16	35	5 33	8 58	6 33	7 46	7 33	6 48	8 33	6 3	10 6	5 8
2 50	14 59	34	5 34	8 57	6 34	7 45	7 34	6 47	8 34	6 2	10 8	5 7
2 55	14 42	33	5 35	8 56	6 35	7 44	7 35	6 46	8 35	6 2	10 10	5 6
3 0	14 26	32	5 36	8 54	6 36	7 43	7 36	6 45	8 36	6 1	10 12	5 5
3 5	14 10	31	5 37	8 53	6 37	7 42	7 37	6 45	8 37	6 0	10 14	5 4
3 10	13 55	30	5 38	8 52	6 38	7 40	7 38	6 44	8 38	6 0	10 16	5 3
3 15	13 41	29	5 39	8 51	6 39	7 39	7 39	6 43	8 39	5 59	10 18	5 2
3 20	13 26	28	5 40	8 49	6 40	7 38	7 40	6 42	8 40	5 58	10 20	5 1
3 25	13 12	27	5 41	8 48	6 41	7 37	7 41	6 41	8 41	5 58	10 22	5 0
3 30	12 58	27	5 42	8 47	6 42	7 36	7 42	6 41	8 42	5 57	10 24	4 59
3 35	12 44	26	5 43	8 45	6 43	7 35	7 43	6 40	8 43	5 56	10 26	4 58
3 40	12 32	25	5 44	8 44	6 44	7 34	7 44	6 39	8 44	5 55	10 28	4 57
3 45	12 19	24	5 45	8 43	6 45	7 33	7 45	6 38	8 45	5 55	10 30	4 56
3 50	12 7	24	5 46	8 41	6 46	7 32	7 46	6 37	8 46	5 54	10 32	4 55
3 55	11 54	23	5 47	8 40	6 47	7 31	7 47	6 37	8 47	5 53	10 34	4 54
4 0	11 43	22	5 48	8 39	6 48	7 30	7 48	6 36	8 48	5 53	10 36	4 53
4 5	11 37	21	5 49	8 38	6 49	7 29	7 49	6 35	8 49	5 52	10 38	4 52
4 10	11 21	20	5 50	8 36	6 50	7 28	7 50	6 34	8 50	5 51	10 40	4 51
4 15	11 11	20	5 51	8 35	6 51	7 27	7 51	6 33	8 51	5 51	10 42	4 50
4 20	11 1	20	5 52	8 34	6 52	7 26	7 52	6 33	8 52	5 50	10 44	4 50
4 25	10 51	19	5 53	8 32	6 53	7 25	7 53	6 32	8 53	5 49	10 46	4 49
4 30	10 41	18	5 54	8 31	6 54	7 24	7 54	6 31	8 54	5 49	10 48	4 48
4 35	10 32	18	5 55	8 30	6 55	7 23	7 55	6 30	8 55	5 48	10 50	4 47
4 40	10 23	17	5 56	8 28	6 56	7 22	7 56	6 29	8 56	5 48	10 52	4 46
4 45	10 15	17	5 57	8 27	6 57	7 21	7 57	6 29	8 57	5 47	10 54	4 45
4 50	10 6	17	5 58	8 26	6 58	7 20	7 58	6 28	8 58	5 46	10 56	4 44
4 55	9 58	16	5 59	8 25	6 59	7 19	7 59	6 27	8 59	5 46	10 58	4 43

(Ther. 50.)
(Bar 30.)

☉ Correction of the Sun's App. Alt. *(subtr.)*
(or Refraction — Parallax.)

AA	Corr. —	AA	Corr. —	AA	Corr. —	AA	Corr. —	AA	Corr. —	AA	Corr. —
° ′	′ ″	° ′	′ ″	° ′	′ ″	° ′	′ ″	° ′	′ ″	° ′	′ ″
11 0	4 42	13 0	3 59	15 0	3 26	20 0	2 30	30 0	1 33	50 0	0 43
11 2	4 42	13 2	3 58	15 5	3 25	20 10	2 29	30 20	1 32	50 30	0 42
11 4	4 41	13 4	3 58	15 10	3 23	20 20	2 28	30 40	1 30	51 0	0 42
11 6	4 40	13 6	3 57	15 15	3 22	20 30	2 26	31 0	1 29	51 30	0 41
11 8	4 39	13 8	3 56	15 20	3 21	20 40	2 25	31 20	1 28	52 0	0 40
11 10	4 38	13 10	3 56	15 25	3 20	20 50	2 23	31 40	1 27	52 30	0 39
11 12	4 38	13 12	3 55	15 30	3 19	21 0	2 22	32 0	1 25	53 0	0 38
11 14	4 37	13 14	3 55	15 35	3 18	21 10	2 21	32 20	1 24	53 30	0 38
11 16	4 36	13 16	3 54	15 40	3 17	21 20	2 20	32 40	1 23	54 0	0 37
11 18	4 35	13 18	3 53	15 45	3 15	21 30	2 19	33 0	1 22	54 30	0 36
11 20	4 34	13 20	3 53	15 50	3 14	21 40	2 17	33 20	1 21	55 0	0 36
11 22	4 34	13 22	3 52	15 55	3 13	21 50	2 16	33 40	1 20	55 30	0 35
11 24	4 33	13 24	3 52	16 0	3 12	22 0	2 15	34 0	1 19	56 0	0 34
11 26	4 32	13 26	3 51	16 5	3 11	22 10	2 14	34 20	1 18	56 30	0 33
11 28	4 31	13 28	3 50	16 10	3 10	22 20	2 13	34 40	1 17	57 0	0 33
11 30	4 30	13 30	3 50	16 15	3 9	22 30	2 12	35 0	1 16	57 30	0 32
11 32	4 30	13 32	3 49	16 20	3 8	22 40	2 11	35 20	1 15	58 0	0 32
11 34	4 29	13 34	3 49	16 25	3 7	22 50	2 9	35 40	1 14	58 30	0 31
11 36	4 28	13 36	3 48	16 30	3 6	23 0	2 8	36 0	1 13	59 0	0 30
11 38	4 27	13 38	3 48	16 35	3 5	23 10	2 7	36 20	1 12	59 30	0 30
11 40	4 26	13 40	3 47	16 40	3 4	23 20	2 6	36 40	1 11	60 0	0 29
11 42	4 26	13 42	3 46	16 45	3 3	23 30	2 5	37 0	1 10	60 30	0 28
11 44	4 25	13 44	3 46	16 50	3 2	23 40	2 4	37 20	1 9	61 0	0 28
11 46	4 24	13 46	3 45	16 55	3 1	23 50	2 3	37 40	1 8	61 30	0 27
11 48	4 23	13 48	3 45	17 0	3 0	24 0	2 2	38 0	1 7	62 0	0 27
11 50	4 22	13 50	3 44	17 5	2 59	24 10	2 1	38 20	1 7	62 30	0 26
11 52	4 22	13 52	3 44	17 10	2 58	24 20	2 0	38 40	1 6	63 0	0 26
11 54	4 21	13 54	3 43	17 15	2 57	24 30	1 59	39 0	1 5	63 30	0 25
11 56	4 21	13 56	3 42	17 20	2 56	24 40	1 58	39 20	1 4	64 0	0 24
11 58	4 20	13 58	3 42	17 25	2 55	24 50	1 57	39 40	1 3	64 30	0 24
12 0	4 19	14 0	3 41	17 30	2 54	25 0	1 56	40 0	1 3	65 0	0 23
12 2	4 19	14 2	3 41	17 35	2 54	25 10	1 55	40 20	1 2	65 30	0 23
12 4	4 18	14 4	3 40	17 40	2 53	25 20	1 54	40 40	1 1	66 0	0 22
12 6	4 17	14 6	3 40	17 45	2 52	25 30	1 54	41 0	1 0	66 30	0 22
12 8	4 16	14 8	3 39	17 50	2 51	25 40	1 53	41 20	0 59	67 0	0 21
12 10	4 16	14 10	3 39	17 55	2 50	25 50	1 52	41 40	0 59	67 30	0 21
12 12	4 15	14 12	3 38	18 0	2 49	26 0	1 51	42 0	0 58	68 0	0 20
12 14	4 14	14 14	3 38	18 5	2 48	26 10	1 50	42 20	0 57	69 0	0 19
12 16	4 14	14 16	3 37	18 10	2 47	26 20	1 49	42 40	0 57	70 0	0 18
12 18	4 13	14 18	3 36	18 15	2 47	26 30	1 48	43 0	0 56	71 0	0 17
12 20	4 12	14 20	3 36	18 20	2 46	26 40	1 48	43 20	0 55	72 0	0 16
12 22	4 11	14 22	3 35	18 25	2 45	26 50	1 47	43 40	0 55	73 0	0 15
12 24	4 11	14 24	3 35	18 30	2 44	27 0	1 46	44 0	0 54	74 0	0 14
12 26	4 10	14 26	3 34	18 35	2 43	27 10	1 45	44 20	0 53	75 0	0 13
12 28	4 9	14 28	3 34	18 40	2 43	27 20	1 44	44 40	0 53	76 0	0 12
12 30	4 9	14 30	3 33	18 45	2 42	27 30	1 44	45 0	0 52	77 0	0 11
12 32	4 8	14 32	3 33	18 50	2 41	27 40	1 43	45 20	0 51	78 0	0 10
12 34	4 7	14 34	3 32	18 55	2 40	27 50	1 42	45 40	0 51	79 0	0 9
12 36	4 7	14 36	3 32	19 0	2 39	28 0	1 41	46 0	0 50	80 0	0 9
12 38	4 6	14 38	3 31	19 5	2 39	28 10	1 41	46 20	0 49	81 0	0 8
12 40	4 5	14 40	3 31	19 10	2 38	28 20	1 40	46 40	0 49	82 0	0 7
12 42	4 5	14 42	3 30	19 15	2 37	28 30	1 39	47 0	0 48	83 0	0 6
12 44	4 4	14 44	3 30	19 20	2 36	28 40	1 38	47 20	0 47	84 0	0 5
12 46	4 3	14 46	3 29	19 25	2 36	28 50	1 38	47 40	0 47	85 0	0 4
12 48	4 3	14 48	3 29	19 30	2 35	29 0	1 37	48 0	0 46	86 0	0 4
12 50	4 2	14 50	3 28	19 35	2 34	29 10	1 36	48 20	0 46	87 0	0 3
12 52	4 1	14 52	3 28	19 40	2 33	29 20	1 36	48 40	0 45	88 0	0 2
12 54	4 1	14 54	3 27	19 45	2 33	29 30	1 35	49 0	0 45	89 0	0 1
12 56	4 0	14 56	3 27	19 50	2 32	29 40	1 34	49 20	0 44	90 0	0 0
12 58	3 59	14 58	3 26	19 55	2 31	29 50	1 33	49 40	0 44		

Correction of ☉'s Altitude (involving Dip, Refraction, Semidiameter, and Parallax).

☉ Obs. Alt.	*Add* the Correction to the Altitude of the *Lower Limb*. Height of the Eye in Feet.																
	6	8	10	12	13	14	15	16	17	18	20	22	24	26	28	30	32
° ′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′	′
5 0	3.8	3.4	3.1	2.8	2.6	2·5	2·3	2.2	2.1	2.0	1.8	1.6	1.4	1.2	1.0	0.8	0.6
10	4.0	3.7	3.3	3.1	2.9	2.8	2.6	2.5	2.4	2.3	2.1	1.8	1.6	1.5	1.3	1.1	0.9
20	4.3	3.9	3.6	3.3	3.2	3.0	2.9	2.8	2.7	2.5	2.3	2.1	1.9	1.7	1.5	1.3	1.1
30	4.5	4.2	3.9	3.6	3.4	3.3	3.1	3.0	2.9	2.8	2.6	2.4	2.2	2.0	1.8	1.6	1.4
40	4.8	4.4	4.1	3.8	3.7	3.5	3.4	3.3	3.2	3.0	2.9	2.6	2.4	2.2	2.0	1.8	1.7
50	5.0	4.6	4.3	4.0	3.9	3.7	3.6	3.5	3.4	3.3	3.0	2.8	2.6	2.4	2.2	2.0	1.9
6 0	5.2	4.9	4.5	4.2	4.1	4.0	3.8	3.7	3.6	3.5	3.3	3.0	2.8	2.6	2.4	2.3	2.1
10	5.4	5.1	4.7	4.4	4.3	4.2	4.0	3.9	3.8	3.7	3.5	3.2	3.0	2.8	2.7	2.5	2.3
20	5.6	5.2	4.9	4.6	4.5	4.3	4.2	4.1	4.0	3.9	3.7	3.5	3.2	3.0	2.8	2.7	2.5
30	5.8	5.4	5.1	4.8	4.7	4.5	4.4	4.3	4.2	4.0	3.8	3.6	3.4	3.2	3.0	2.9	2.7
40	5.9	5.6	5.3	5.0	4.9	4.7	4.6	4.5	4.3	4.2	4.0	3.9	3.6	3.4	3.2	3.0	2.9
50	6.1	5.8	5.5	5.2	5.0	4.9	4.8	4.6	4.5	4.4	4.2	4.0	3.8	3.6	3.4	3.2	3.0
7 0	6.3	5.9	5.6	5.3	5.2	5.1	4.9	4.8	4.7	4.6	4.3	4.2	3.9	3.7	3.6	3.4	3.2
20	6.6	6.2	5.9	5.6	5.4	5.3	5.2	5.1	4.9	4.8	4.6	4.4	4.2	4.0	3.8	3.6	3.5
40	6.9	6.5	6.2	5.9	5.7	5.6	5.5	5.3	5 2	5.1	4.9	4.7	4.4	4.2	4.1	3.9	3.8
8 0	7.1	6.8	6.4	6.1	6.0	5.9	5.7	5.6	5.5	5.4	5.1	4.9	4.7	4.5	4.3	4.1	4.0
20	7.4	7.0	6.7	6.4	6.2	6.1	6.0	5.8	5.7	5.6	5.4	5.1	4.9	4.7	4.6	4.4	4.3
40	7.6	7.2	6.9	6.6	6.5	6.3	6.2	6.1	5.9	5.8	5.6	5.4	5.2	5.0	4.8	4.6	4.5
9 0	7.8	7.4	7.1	6.8	6.7	6.5	6.4	6.3	6.2	6.0	5.8	5.6	5.4	5.2	5.0	4.8	4.7
20	8.0	7.6	7.3	7.0	6.9	6.7	6.6	6.5	6 4	6.2	6.0	5.8	5.6	5.4	5.2	5.0	4.9
40	8.2	7.8	7.5	7.2	7.1	6.9	6.8	6.7	6.6	6.4	6.2	6.0	5.8	5.6	5.4	5.2	5.1
10 0	8.4	8.0	7.7	7.4	7.2	7.1	7.0	6.9	6.7	6.6	6.4	6.2	6.0	5.8	5.6	5.4	5.3
30	8.6	8.3	7.9	7.6	7.5	7.3	7.2	7.1	7.0	6.9	6.6	6.4	6.2	6.0	5.8	5.6	5.5
11 0	8.9	8.5	8.2	7.9	7.7	7.6	7.5	7.3	7.2	7.1	6.8	6.6	6.4	6.2	6.1	5.9	5.7
11 30	9.1	8.7	8.4	8.1	7.9	7.8	7.7	7.5	7·4	7.3	7.1	6.8	6.6	6.4	6.3	6.1	5.9
12°	9.3	8.9	8.6	8.2	8.1	8.0	7.9	7.7	7.6	7.5	7.3	7.0	6.8	6.6	6.5	6.3	6.2
13	9.6	9.2	8.9	8.6	8.5	8.3	8.2	8.1	7.9	7.8	7.6	7.4	7.2	7.0	6.8	6.6	6.5
14	9.9	9.5	9.2	8.9	8.8	8.6	8.5	8.4	8.2	8.1	7.9	7.7	7.5	7.3	7.1	6.9	6.8
15	10.2	9.8	9.5	9.2	9.0	8.9	8.8	8.6	8.5	8.4	8.2	7.9	7.7	7.5	7.4	7.2	7.0
16	10.4	10.0	9.7	9.4	9.2	9.1	9.0	8.9	8.7	8.6	8.4	8.2	8.0	7.8	7.6	7.4	7.2
17	10.6	10.2	9.9	9.6	9.4	9.3	9.2	9.1	8.9	8.8	8.6	8.4	8.2	8.0	7.8	7.6	7.4
18	10.8	10.4	10.1	9.8	9.6	9.5	9.4	9.2	9.1	9.0	8.8	8.6	8.4	8.2	8.0	7.8	7.6
19	10.9	10.6	10.2	9.9	9.8	9.7	9.5	9.4	9.3	9.2	8.9	8.7	8.5	8.3	8.1	8.0	7.8
20	11.1	10.7	10.4	10.1	9.9	9.8	9.7	9.6	9.4	9.3	9.1	8.9	8.7	8.5	8.3	8.1	7.9
22	11.3	11.0	10.6	10.3	10.2	10.1	9.9	9.8	9.7	9.6	9.4	9.1	8.9	8.7	8.5	8.4	8.2
24	11.6	11.2	10.9	10.6	10.4	10.3	10.2	10.0	9.9	9.8	9.6	9.4	9.1	9.0	8.8	8.6	8.4
26	11.7	11.4	11.0	10.7	10.6	10.5	10.3	10.2	10.1	10.0	9.8	9.5	9.3	9.1	8.9	8.8	8.6
28	11.9	11.5	11.2	10.9	10.8	10.6	10.5	10.4	10.3	10.2	9.9	9.7	9.5	9.3	9.1	8.9	8.7
30	12.0	11.7	11.3	11.0	10.9	10.8	10 6	10.5	10.4	10.3	10.1	9.8	9.6	9.4	9.3	9.1	8.9
34	12.3	11.9	11.6	11.3	11.1	11.0	10.9	10.7	10.6	10.5	10.3	10.1	9.9	9.7	9.5	9.3	9.1
38	12.5	12.1	11.8	11.5	11.3	11.2	11.1	10.9	10.8	10.7	10.5	10.3	10.1	9.9	9.7	9.5	9.3
42	12.6	12.3	11.9	11.6	11.5	11.4	11.2	11.1	11.0	10.9	10.6	10.4	10.2	10.0	9.8	9.7	9.4
46	12.8	12.4	12.1	11.8	11.6	11.5	11.4	11.2	11.1	11.0	10.8	10.6	10.4	10.2	10.0	9.8	9.6
50	12.9	12.5	12.2	11.9	11.7	11.6	11.5	11.4	11.2	11.1	10.9	10.7	10.5	10.3	10.1	9.9	9.7
55	13.0	12.6	12.3	12.0	11.9	11.7	11.6	11.5	11.4	11.2	11.0	10.8	10.6	10.4	10.2	10.0	9.8
60	13.1	12.7	12.4	12.1	12.0	11.8	11.7	11.6	11.5	11.3	11.1	10.9	10.7	10.5	10.3	10.1	9.9
70	13.3	12.9	12.6	12.3	12.2	12.0	11.9	11.8	11.7	11.5	11.3	11.1	10.9	10.7	10.5	10.3	10.1
80	13.4	13.1	12.8	12.5	12.3	12.2	12.1	11.9	11.8	11.7	11.5	11.3	11.0	10.9	10.7	10.5	10.3
90	13.5	13.2	12.9	12.6	12.5	12.3	12.2	12.1	12.0	11.8	11.6	11.4	11.2	11.0	10.8	10.6	10.4

Month.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
	′	′	′	′	′	′	′	′	′	′	′	′
1st day . .	+0.3	+0.2	+0.2	−0.0	−0.1	−0.2	−0.2	−0.2	−0.1	+0.0	+0.1	+0.2
16th day . .	+0.3	+0.2	+0.1	−0.1	−0.2	−0.2	−0.2	−0.2	−0.1	+0.1	+0.2	+0.3

* When the upper limb of the Sun has been observed, proceed as above, and deduct 32′.

Sun's Declination at Mean Noon at Greenwich.

For the Year 1885.

Day.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
1	22 58 S	16 58 S	7 24 S	4 43 N	15 18 N	22 7 N	23 6 N	17 56 N	8 8 N	3 21 S	14 35 S	21 53 S
2	22 53	16 40	7 1	5 6	15 31	22 15	23 1	17 40	7 46	3 45	14 54	22 2
3	22 47	16 23	6 38	5 29	15 48	22 22	22 56	17 25	7 24	4 8	15 13	22 11
4	22 41	16 5	6 15	5 52	16 6	22 29	22 51	17 9	7 2	4 31	15 31	22 19
5	22 34	15 46	5 52	6 15	16 23	22 36	22 46	16 53	6 40	4 54	15 50	22 26
6	22 27	15 28	5 29	6 37	16 40	22 42	22 40	16 36	6 18	5 17	16 8	22 34
7	22 19	15 9	5 6	7 0	16 56	22 48	22 33	16 19	5 55	5 40	16 25	22 40
8	22 11	14 50	4 42	7 22	17 12	22 53	22 27	16 2	5 32	6 3	16 43	22 47
9	22 2	14 31	4 19	7 45	17 28	22 58	22 19	15 45	5 10	6 26	17 0	22 53
10	21 53	14 11	3 55	8 7	17 44	23 3	22 12	15 27	4 47	6 49	17 17	22 58
11	21 44	13 52	3 32	8 29	18 0	23 7	22 4	15 10	4 24	7 12	17 34	23 3
12	21 34	13 32	3 8	8 51	18 15	23 11	21 56	14 52	4 1	7 34	17 50	23 7
13	21 24	13 12	2 44	9 13	18 30	23 15	21 47	14 33	3 38	7 57	18 6	23 12
14	21 13	12 51	2 21	9 34	18 44	23 18	21 38	14 15	3 15	8 19	18 22	23 15
15	21 2	12 31	1 57	9 56	18 58	23 20	21 28	13 56	2 52	8 41	18 37	23 18
16	20 51	12 10	1 33	10 17	19 12	23 22	21 19	13 37	2 29	9 3	18 52	23 21
17	20 39	11 49	1 10	10 38	19 26	23 24	21 9	13 18	2 6	9 25	19 7	23 23
18	20 27	11 28	0 46	10 59	19 39	23 25	20 58	12 59	1 42	9 47	19 21	23 25
19	20 14	11 6	0 22 S	11 20	19 52	23 26	20 47	12 39	1 19	10 9	19 35	23 26
20	20 1	10 45	0 1 N	11 40	20 4	23 27	20 36	12 19	0 56	10 30	19 49	23 27
21	19 48	10 23	0 25	12 1	20 17	23 27	20 24	11 59	0 32	10 52	20 2	23 27
22	19 34	10 1	0 49	12 21	20 28	23 27	20 13	11 39	0 9 N	11 13	20 15	23 27
23	19 20	9 39	1 12	12 41	20 40	23 26	20 0	11 19	0 14 S	11 34	20 27	23 26
24	19 5	9 17	1 36	13 1	20 51	23 25	19 48	10 58	0 38	11 55	20 39	23 25
25	18 51	8 55	2 0	13 20	21 2	23 23	19 35	10 38	1 1	12 16	20 51	23 24
26	18 35	8 32	2 23	13 39	21 12	23 21	19 22	10 17	1 25	12 36	21 2	23 22
27	18 20	8 10	2 47	13 59	21 22	23 19	19 8	9 56	1 48	12 57	21 13	23 19
28	18 4	7 47	3 10	14 17	21 32	23 16	18 54	9 34	2 11	13 17	21 24	23 16
29	17 48		3 33	14 36	21 41	23 13	18 40	9 13	2 35	13 37	21 34	23 13
30	17 32		3 57	14 54	21 50	23 10	18 26	8 52	2 58	13 56	21 44	23 9
31	17 15		4 20		21 59		18 11	8 30		14 16		23 4

For the Year 1886.

	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
1	22 59 S	17 2 S	7 30 S	4 37 N	15 8 N	22 5 N	23 7 N	17 59 N	8 13 N	3 16 S	14 31 S	21 51 S
2	22 54	16 45	7 7	5 0	15 26	22 13	23 2	17 44	7 52	3 39	14 50	22 0
3	22 48	16 27	6 44	5 23	15 44	22 20	22 58	17 28	7 30	4 2	15 8	22 9
4	22 42	16 9	6 21	5 46	16 1	22 28	22 53	17 13	7 7	4 26	15 27	22 17
5	22 35	15 51	5 58	6 9	16 19	22 34	22 47	16 56	6 45	4 49	15 45	22 25
6	22 28	15 33	5 35	6 32	16 35	22 41	22 41	16 40	6 23	5 12	16 3	22 32
7	22 21	15 14	5 11	6 54	16 52	22 47	22 35	16 23	6 0	5 35	16 21	22 39
8	22 13	14 55	4 48	7 17	17 9	22 52	22 28	16 6	5 38	5 58	16 39	22 45
9	22 4	14 36	4 24	7 39	17 25	22 57	22 21	15 49	5 15	6 21	16 56	22 51
10	21 56	14 16	4 1	8 1	17 40	23 2	22 14	15 32	4 52	6 43	17 13	22 57
11	21 46	13 57	3 37	8 23	17 56	23 6	22 6	15 14	4 30	7 6	17 30	23 2
12	21 37	13 37	3 14	8 45	18 11	23 10	21 58	14 56	4 7	7 29	17 46	23 6
13	21 26	13 17	2 50	9 7	18 26	23 14	21 49	14 38	3 44	7 51	18 2	23 11
14	21 16	12 56	2 27	9 29	18 41	23 17	21 40	14 19	3 21	8 14	18 18	23 14
15	21 5	12 36	2 3	9 50	18 55	23 20	21 31	14 1	2 58	8 36	18 33	23 17
16	20 54	12 15	1 39	10 12	19 9	23 22	21 21	13 42	2 34	8 58	18 48	23 20
17	20 42	11 54	1 15	10 33	19 22	23 24	21 11	13 23	2 11	9 20	19 3	23 23
18	20 30	11 33	0 52	10 54	19 36	23 25	21 1	13 3	1 48	9 42	19 17	23 24
19	20 17	11 11	0 28	11 15	19 49	23 26	20 50	12 44	1 25	10 4	19 32	23 26
20	20 4	10 50	0 4 S	11 35	20 1	23 27	20 39	12 24	1 1	10 25	19 45	23 27
21	19 51	10 28	0 19 N	11 56	20 14	23 27	20 27	12 4	0 38	10 47	19 59	23 27
22	19 37	10 7	0 43	12 16	20 25	23 27	20 15	11 44	0 15 N	11 8	20 12	23 27
23	19 23	9 45	1 7	12 36	20 37	23 26	20 3	11 24	0 9 S	11 29	20 24	23 26
24	19 9	9 22	1 30	12 56	20 48	23 25	19 51	11 3	0 32	11 50	20 36	23 25
25	18 54	9 0	1 54	13 15	20 59	23 24	19 38	10 43	0 56	12 11	20 48	23 24
26	18 39	8 38	2 17	13 35	21 10	23 22	19 25	10 22	1 19	12 31	21 0	23 22
27	18 24	8 15	2 41	13 54	21 20	23 20	19 11	10 1	1 42	12 52	21 11	23 20
28	18 8	7 53	3 4	14 13	21 30	23 17	18 58	9 40	2 6	13 12	21 22	23 17
29	17 52		3 28	14 31	21 39	23 14	18 43	9 18	2 29	13 32	21 32	23 13
30	17 36		3 51	14 50	21 48	23 10	18 29	8 57	2 52	13 52	21 42	23 10
31	17 19		4 14		21 57		18 14	8 35		14 11		23 5

NOTE.—The Declination under each year will approximately serve for each succeeding 4th year for four or five such periods, the greatest error (which occurs at the equinoxes) not amounting to more than 3·6 in 20 years.

Sun's Declination at Mean Noon at Greenwich.

For the Year 1887.

Day.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
1	23 1 S	17 6 S	7 35 S	4 32 N	15 4 N	22 3 N	23 8 N	18 3 N	8 19 N	3 10 S	14 26 S	21 49 S
2	22 55	16 49	7 13	4 55	15 22	22 11	23 3	17 48	7 57	3 33	14 45	21 58
3	22 50	16 31	6 50	5 18	15 40	22 19	22 59	17 32	7 35	3 57	15 4	22 7
4	22 44	16 13	6 27	5 41	15 57	22 26	22 54	17 17	7 13	4 20	15 22	22 15
5	22 37	15 55	6 3	6 4	16 14	22 33	22 48	17 0	6 51	4 43	15 41	22 23
6	22 30	15 37	5 40	6 26	16 31	22 39	22 43	16 44	6 28	5 6	15 59	22 30
7	22 23	15 18	5 17	6 49	16 48	22 45	22 36	16 27	6 6	5 29	16 17	22 37
8	22 15	15 0	4 54	7 12	17 5	22 51	22 30	16 11	5 43	5 52	16 34	22 44
9	22 7	14 40	4 30	7 34	17 21	22 56	22 23	15 53	5 21	6 15	16 52	22 50
10	21 58	14 21	4 7	7 56	17 37	23 1	22 16	15 36	4 58	6 38	17 9	22 55
11	21 49	14 1	3 43	8 18	17 52	23 5	22 8	15 18	4 35	7 0	17 26	23 1
12	21 39	13 42	3 20	8 40	18 7	23 9	22 0	15 0	4 12	7 23	17 42	23 5
13	21 29	13 22	2 56	9 2	18 22	23 13	21 51	14 42	3 49	7 46	17 58	23 10
14	21 19	13 1	2 32	9 24	18 37	23 16	21 42	14 24	3 26	8 8	18 14	23 13
15	21 8	12 41	2 9	9 45	18 51	23 19	21 33	14 5	3 3	8 30	18 29	23 17
16	20 56	12 20	1 45	10 6	19 5	23 21	21 23	13 46	2 40	8 53	18 45	23 20
17	20 45	11 59	1 21	10 28	19 19	23 23	21 14	13 27	2 17	9 15	18 59	23 22
18	20 33	11 38	0 58	10 49	19 32	23 25	21 3	13 8	1 54	9 37	19 14	23 24
19	20 20	11 17	0 34	11 10	19 46	23 26	20 53	12 49	1 30	9 58	19 28	23 25
20	20 7	10 55	0 10 S	11 30	19 58	23 27	20 41	12 29	1 7	10 20	19 42	23 26
21	19 54	10 34	0 14 N	11 51	20 11	23 27	20 30	12 9	0 44	10 41	19 55	23 27
22	19 41	10 12	0 37	12 11	20 23	23 27	20 18	11 49	0 20 N	11 3	20 8	23 27
23	19 27	9 50	1 1	12 31	20 34	23 26	20 6	11 29	0 3 S	11 24	20 21	23 27
24	19 12	9 28	1 24	12 51	20 46	23 26	19 54	11 8	0 26	11 45	20 33	23 26
25	18 58	9 6	1 48	13 11	20 57	23 24	19 41	10 48	0 50	12 6	20 45	23 24
26	18 43	8 43	2 12	13 30	21 7	23 22	19 28	10 27	1 13	12 26	20 57	23 23
27	18 28	8 21	2 35	13 49	21 18	23 20	19 15	10 6	1 37	12 47	21 8	23 20
28	18 12	7 58	2 59	14 8	21 27	23 18	19 1	9 45	2 0	13 7	21 19	23 18
29	17 56		3 22	14 27	21 37	23 15	18 47	9 23	2 23	13 27	21 29	23 14
30	17 40		3 45	14 46	21 46	23 11	18 33	9 2	2 47	13 47	21 39	23 11
31	17 23		4 9		21 55		18 18	8 40		14 6		23 6

For the Year 1888.

	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
1	23 2 S	17 10 S	7 18 S	4 49 N	15 18 N	22 9 N	23 5 N	17 52 N	8 2 N	3 28 S	14 40 S	21 56 S
2	22 57	16 53	6 55	5 12	15 35	22 17	23 0	17 36	7 40	3 51	14 59	22 5
3	22 51	16 36	6 32	5 35	15 53	22 24	22 55	17 20	7 18	4 14	15 18	22 13
4	22 45	16 18	6 9	5 58	16 10	22 31	22 50	17 4	6 56	4 37	15 36	22 21
5	22 39	16 0	5 46	6 21	16 27	22 38	22 44	16 48	6 34	5 0	15 55	22 28
6	22 32	15 42	5 23	6 44	16 44	22 44	22 38	16 32	6 11	5 23	16 13	22 36
7	22 25	15 23	4 59	7 6	17 1	22 50	22 32	16 15	5 49	5 46	16 30	22 42
8	22 17	15 4	4 36	7 28	17 17	22 55	22 25	15 58	5 26	6 9	16 48	22 48
9	22 9	14 45	4 12	7 51	17 33	23 0	22 17	15 40	5 4	6 32	17 5	22 54
10	22 0	14 26	3 49	8 13	17 48	23 4	22 10	15 23	4 41	6 55	17 22	22 59
11	21 51	14 6	3 25	8 35	18 4	23 8	22 2	15 5	4 18	7 18	17 38	23 4
12	21 41	13 46	3 2	8 57	18 19	23 12	21 53	14 47	3 55	7 40	17 54	23 9
13	21 31	13 26	2 38	9 18	18 34	23 15	21 45	14 28	3 32	8 3	18 10	23 13
14	21 21	13 6	2 14	9 40	18 48	23 18	21 35	14 10	3 9	8 25	18 26	23 16
15	21 10	12 46	1 51	10 1	19 2	23 21	21 26	13 51	2 46	8 47	18 41	23 19
16	20 59	12 25	1 27	10 23	19 16	23 23	21 16	13 32	2 23	9 9	18 56	23 22
17	20 48	12 4	1 3	10 44	19 29	23 25	21 6	13 13	1 59	9 31	19 10	23 24
18	20 36	11 43	0 39	11 5	19 43	23 26	20 55	12 53	1 36	9 53	19 25	23 25
19	20 23	11 22	0 16 S	11 25	19 55	23 27	20 44	12 34	1 13	10 15	19 39	23 26
20	20 11	11 0	0 8 N	11 46	20 8	23 27	20 33	12 14	0 50	10 36	19 52	23 27
21	19 57	10 39	0 32	12 6	20 20	23 27	20 21	11 54	0 26	10 57	20 5	23 27
22	19 44	10 17	0 55	12 26	20 32	23 27	20 9	11 34	0 3 N	11 19	20 18	23 27
23	19 30	9 55	1 19	12 46	20 43	23 26	19 57	11 13	0 21 S	11 40	20 31	23 26
24	19 16	9 33	1 43	13 6	20 54	23 25	19 44	10 53	0 44	12 1	20 43	23 25
25	19 1	9 11	2 6	13 25	21 5	23 23	19 31	10 32	1 7	12 21	20 54	23 23
26	18 46	8 49	2 30	13 45	21 15	23 21	19 18	10 11	1 31	12 42	21 5	23 21
27	18 31	8 26	2 53	14 4	21 25	23 18	19 4	9 50	1 54	13 2	21 16	23 18
28	18 16	8 4	3 16	14 23	21 35	23 16	18 50	9 29	2 18	13 22	21 27	23 15
29	18 0	7 41	3 40	14 41	21 44	23 12	18 36	9 7	2 41	13 42	21 37	23 12
30	17 44		4 3	14 59	21 53	23 9	18 22	8 46	3 4	14 2	21 47	23 8
31	17 27		4 26		22 1		18 7	8 24		14 21		23 3

Mean Places of the Principal Stars for January 1, 1888.

Star's Name.	Mag.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
		h. m. s.	s.	° ′ ″	″
α Andromedæ	2	0 2 35	+ 3·08	+28 · 28 19	+19·90
γ Pegasi (*Algenib*)	3·2	0 7 28	3·08	+14 33 38	20·02
β Hydri	3	0 19 51	3·25	−77 53 7	20·29
α Cassiopeiæ (var.)	2·3	0 34 9	3·37	+55 · 55 22	19·79
β Ceti	2	0 37 57	3·01	−18 · 36 4	19·79
β Andromedæ	2·3	1 3 27	3·34	+35 1 35	19·19
α Ursæ Minoris (*Polaris*)	2	1 17 42	22·90	+88 42 40	18·91
θ Ceti	3	1 18 25	2·99	− 8 · 45 41	18·66
α Eridani (*Achernar*)	1	1 33 32	2·23	−57 48 21	18·37
β Arietis	3·2	1 48 27	3·29	+20 15 36	17·73
α Arietis	2	2 0 51	3·36	+22 55 56	17·17
α Ceti	2·3	2 56 25	3·12	+ 3 · 38 58	14·28
α Persei	2	3 16 19	4·25	+49 · 27 41	13·08
ε Eridani	3	3 27 39	2·82	− 9 · 50 17	12·32
η Tauri	3	3 40 49	3·55	+23 · 45 28	11·38
γ¹ Eridani	3	3 52 48	2·79	−13 · 49 40	10·44
α Tauri (*Aldebaran*)	1	4 29 29	3·43	+16 · 17 0	7·54
ι Aurigæ	3	4 49 41	3·89	+32 · 59 16	6·03
α Aurigæ (*Capella*)	1	5 8 24	4·42	+45 · 52 58	4·04
β Orionis (*Rigel*)	1	5 9 9	2·88	− 8 · 19 54	4·39
β Tauri	2	5 19 12	3·79	+28 · 30 42	3·34
δ Orionis	2	5 26 17	3·06	− 0 · 22 58	2·89
α Leporis	3	5 27 47	2·64	−17 · 54 12	2·80
ε Orionis	2	5 30 31	3·04	− 1 · 16 27	2·55
α Columbæ	2	5 35 35	2·17	−34 · 8 · 4	2·08
κ Orionis	3·2	5 42 26	2·84	− 9 · 42 36	1·50
α Orionis (var.)	1	5 49 6	3·24	+ 7 · 23 · 7	+ 0·95
μ Geminorum	3	6 16 11	3·63	+22 · 34 12	− 1·55
α Argûs (*Canopus*)	1	6 21 27	1·33	−52 38 5	1·87
γ Geminorum	2·3	6 31 14	3·46	+16 · 29 38	2·76
α Canis Majoris (*Sirius*)	1	6 40 12	2·64	−16 33 48	4·74
ε Canis Majoris	2·1	6 54 13	2·35	−28 49 12	4·72
β Canis Minoris	3	7 21 4	3·25	+ 8 30 51	7·00
α² Geminorum (*Castor*)	2·1	7 27 27	3·83	+32 7 59	7·55
α Canis Minoris (*Procyon*)	1	7 33 26	3·14	+ 5 30 39	9·03
β Geminorum (*Pollux*)	1·2	7 38 27	3·67	+28 17 44	8·41
15 Argûs	3	8 2 46	2·55	−23 58 54	10·17
ι Ursæ Majoris	3	8 51 32	4·13	+48 28 50	13·93
ι Argûs	2	9 14 5	1·60	−58 48 19	15·02
α Hydræ	2	9 22 4	2·94	− 8 10 24	15·45
θ Ursæ Majoris	3	9 25 21	4·03	+52 11 13	16·23
ε Leonis	3	9 39 29	3·41	+24 17 21	16·42
α Leonis (*Regulus*)	1·2	10 2 24	3·19	+12 30 51	17·46
γ¹ Leonis	2	10 13 47	3·31	+20 24 27	18·09
η Argûs (var.)	1·6	10 40 42	2·31	−59 5 44	18·86
α Ursæ Majoris	2	10 56 48	3·74	+62 21 19	19·38
δ Leonis	2·3	11 8 9	3·19	+21 8 13	19·68
β Leonis	2	11 43 20	3·06	+15 11 53	20·10
γ Ursæ Majoris	2·3	11 47 56	3·18	+54 19 2	20·02
ε Corvi	3	12 4 21	3·07	−21 59 47	20·04
α¹ Crucis	1	12 20 22	3·29	−62 28 40	19·99
δ² Corvi	2·3	12 24 4	3·10	−15 53 30	20·09
β Corvi	2·3	12 28 30	3·13	−22 46 37	19·96
γ¹ Virginis	3·2	12 35 59	3·03	− 0 50 · 4	19·85
δ Virginis	3	12 49 57	3·02	+ 4 0 22	19·66
α Canum Venaticor	3	12 50 47	2·81	+38 55 23	19·50
ε Virginis	3·2	12 56 36	2·98	+11 33 40	19·41
α Virginis (*Spica*)	1	13 19 17	3·15	−10 34 35	18·90
η Ursæ Majoris	2	13 43 7	2·37	+49 52 20	18·08
η Bootis	3	13 49 21	2·85	+18 57 33	18·17
β Centauri	1	13 55 55	4·18	−59 49 56	17·59
α Bootis (*Arcturus*)	1	14 10 33	2·73	+19 45 57	18·81
α² Centauri	1	14 32 0	4·03	−60 22 13	15·06
ε² Bootis	2·3	14 40 5	2·61	+27 32 48	15·34
α Libræ	2·3	14 44 40	+ 3·31	−15 34 32	15·15
β Ursæ Minoris	2	14 51 2	− 0·22	+74 36 47	14·75
β Libræ	2	15 10 58	+ 3·21	− 8 58 8	13·49
α Coronæ	2	15 29 56	2·53	+27 5 31	12·28
α Serpentis	2·3	15 38 45	2·95	+ 6 46 42	11·54
β¹ Scorpii	2	15 58 55	+ 3·47	−19 29 52	− 10·12

Mean Places of the Principal Stars for January 1, 1888.

Star's Name.	Mag.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
		h. m. s.	s.	° ′ ″	″
δ Ophiuchi	3	16 8 28	3·13	− 3 24 18	9·50
γ Herculis	3	16 16 58	2·64	+19 25 0	8·65
η^2 Draconis	3·2	16 22 28	0·80	+61 46 3	8·26
α Scorpii (*Antares*)	1·2	16 22 32	3·67	−26 10 57	8·30
ζ Ophiuchi	3·2	16 30 59	3·29	− 10 20 21	7·56
α Trianguli Australis	2	16 36 48	6·30	−68 49 13	7·14
ζ Herculis	3·2	16 37 3	2·26	+31 48 22	6·64
η Ophiuchi	2·3	17 3 57	3·43	− 15 35 6	4·73
β Draconis	3·2	17 27 54	1·35	+52 23 4	2·79
α Ophiuchi	2	17 29 44	2·77	+12 38 32	2·83
β Ophiuchi	3	17 37 56	2·95	+ 4 36 53	1·75
γ Draconis	2·3	17 54 0	1·39	+51 30 7	− 0·56
η Serpentis	3	18 15 30	3·10	− 2 55 36	+ 0·68
λ Sagittarii	3	18 21 3	3·70	−25 28 57	1·60
α Lyræ (*Vega*)	1	18 33 8	2·03	+38 40 47	3·17
ζ Aquilæ	3	19 0 15	2·75	+13 41 51	5·14
γ Aquilæ	3	19 40 56	2·85	+10 20 26	8·55
α Aquilæ (*Altair*)	1·2	19 45 19	2·92	+ 8 34 22	9·27
θ Aquilæ	3	20 5 31	3·09	− 1 9 11	10·44
α Pavonis	2	20 16 46	4·77	−57 5 33	11·22
α Cygni	2·1	20 37 36	2·04	+44 52 49	12·73
ζ Cygni	3	21 8 10	2·54	+29 46 3	14·60
α Cephei	3·2	21 15 54	1·43	+62 6 39	15·13
β Aquarii	3	21 25 39	3·16	− 6 3 48	15·67
β^2 Cephei	3	21 27 12	0·79	+70 4 7	15·72
ε Pegasi	2·3	21 38 41	2·94	+ 9 21 42	16·36
α Aquarii	3	22 0 1	3·07	− 0 51 48	17·34
α Gruis	2	22 1 10	3·80	−47 30 10	17·26
α Pis. Aus. (*Fomalhaut*)	1·2	22 51 27	3·32	−30 12 56	18·98
α Pegasi (*Markab*)	2	22 59 10	2·98	+14 36 10	19·33

TABLE 20.

Parallax in Altitude for Planets.

App. Alt.	*Horizontal Parallax.*															
	2″	4″	6″	8″	10″	12″	14″	16″	18″	20″	22″	24″	26″	28″	30″	32″
	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
°	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″	″
0	2·0	4·0	6·0	8·0	10·0	12·0	14·0	16·0	18·0	20·0	22·0	24·0	26·0	28·0	30·0	32·0
3	2·0	4·0	6·0	8·0	10·0	12·0	14·0	16·0	18·0	20·0	22·0	24·0	26·0	28·0	30·0	32·0
6	2·0	3·9	5·9	7·9	9·9	11·9	13·9	15·9	17·9	19·9	21·9	23·9	25·9	27·9	29·8	31·8
9	2·0	3·9	5·9	7·9	9·9	11·9	13·8	15·8	17·8	19·8	21·7	23·7	25·7	27·6	29·6	31·6
12	1·9	3·9	5·9	7·8	9·8	11·7	13·7	15·6	17·6	19·6	21·5	23·5	25·4	27·4	29·3	31·3
15	1·9	3·8	5·8	7·7	9·6	11·6	13·5	15·5	17·3	19·3	21·3	23·2	25·1	27·1	29·0	30·9
18	1·9	3·8	5·7	7·6	9·5	11·4	13·3	15·2	17·1	19·0	20·9	22·8	24·7	26·6	28·5	30·4
21	1·9	3·7	5·6	7·5	9·4	11·2	13·0	14·9	16·8	18·7	20·5	22·4	24·2	26·1	28·0	29·9
24	1·8	3·6	5·5	7·3	9·1	11·0	12·8	14·6	16·4	18·2	20·0	21·9	23·7	25·5	27·4	29·2
27	1·8	3·6	5·3	7·1	8·9	10·7	12·5	14·2	16·0	17·8	19·6	21·4	23·1	24·9	26·7	28·5
30	1·7	3·4	5·1	6·9	8·7	10·4	12·1	13·8	15·6	17·3	19·0	20·8	22·5	24·2	26·0	27·7
33	1·7	3·3	5·0	6·7	8·4	10·0	11·7	13·4	15·0	16·8	18·4	20·1	21·8	23·5	25·1	26·8
36	1·6	3·2	4·8	6·4	8·0	9·7	11·3	12·9	14·6	16·2	17·8	19·4	21·0	22·6	24·2	25·9
39	1·5	3·1	4·6	6·2	7·8	9·3	10·8	12·4	14·0	15·5	17·0	18·6	20·2	21·7	23·3	24·9
42	1·5	3·0	4·5	5·9	7·4	8·9	10·4	11·9	13·4	14·9	16·3	17·8	19·3	20·8	22·3	23·8
45	1·4	2·8	4·2	5·6	7·1	8·5	9·9	11·3	12·7	14·1	15·6	16·9	18·4	19·8	21·2	22·6
48	1·3	2·7	4·0	5·3	6·7	8·0	9·3	10·7	12·0	13·4	14·7	16·1	17·4	18·7	20·1	21·4
51	1·2	2·5	3·8	5·0	6·3	7·6	8·8	10·1	11·3	12·6	13·8	15·1	16·4	17·6	18 9	20·1
54	1·1	2·3	3·5	4·7	5·9	7·1	8·2	9·4	10·5	11·7	12·9	14·1	15·3	16·4	17·6	18·8
57	1·1	2·1	3·3	4·3	5·4	6·5	7·6	8·7	9·8	10·9	12·0	13·1	14·1	15·2	16·3	17·4
60	1·0	2·0	3·0	4·0	5·0	6·0	7·0	8·0	9·0	10·0	11·0	12·0	13·0	14·0	15·0	16·0
65	0·8	1·7	2·5	3·4	4·2	5·1	5·9	6·7	7·6	8·4	9·3	10·1	11·0	11·8	12·7	13·5
70	0·7	1·4	2·1	2·7	3·4	4·1	4·8	5·5	6·1	6·8	7·5	8·2	8·9	9·6	10·3	10·9
75	0·5	1·0	1·5	2·1	2·6	3·1	3·6	4·1	4·6	5·1	5·7	6·2	6·7	7·2	7·8	8·3
80	0·3	0·7	1·0	1·4	1·7	2·1	2·4	2·8	3·1	3·5	3·8	4·2	4·5	4·8	5·2	5·5
85	0·2	0·3	0·5	0·7	0·8	1·0	1·2	1·4	1·6	1·7	1·9	2·1	2·3	2·4	2·6	2·8
90	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0	0·0

Reduction to the Meridian. Part I.

	M. 0	M. 1	M. 2	M. 3	M. 4	M. 5	M. 6	M. 7	M. 8	M. 9	M. 10	M. 11	M. 12	M. 13	M. 14	
S.																S.
0	0″	2″	7″	17″	31″	49″	70″	96″	125″	159″	196″	237″	282″	331″	384″	0
1	0	2	8	17	31	49	71	96	126	159	197	238	283	332	385	1
2	0	2	8	18	31	49	71	97	126	160	197	239	284	333	386	2
3	0	2	8	18	32	50	71	97	127	160	198	239	285	334	387	3
4	0	2	8	18	32	50	72	98	127	161	198	240	285	335	388	4
5	0	2	8	18	32	50	72	98	128	162	199	241	286	336	389	5
6	0	2	8	18	33	51	73	99	128	162	200	241	287	336	390	6
7	0	2	8	19	33	51	73	99	129	163	200	242	288	337	391	7
8	0	2	8	19	33	51	73	99	129	163	201	243	289	338	392	8
9	0	2	9	19	33	52	74	100	130	164	202	244	289	339	393	9
10	0	2	9	19	34	52	74	100	131	165	202	244	290	340	393	10
11	0	2	9	19	34	52	75	101	131	165	203	245	291	341	394	11
12	0	2	9	20	34	53	75	101	132	166	204	246	292	342	395	12
13	0	2	9	20	34	53	75	102	132	166	204	247	293	342	396	13
14	0	3	9	20	35	53	76	102	133	167	205	247	293	343	397	14
15	0	3	9	20	35	54	76	103	133	168	206	248	294	344	398	15
16	0	3	10	20	35	54	77	103	134	168	206	249	295	345	399	16
17	0	3	10	21	36	54	77	104	134	169	207	249	296	346	400	17
18	0	3	10	21	36	55	77	104	135	169	208	250	297	347	401	18
19	0	3	10	21	36	55	78	105	135	170	208	251	297	348	402	19
20	0	3	10	21	36	55	78	105	136	171	209	252	298	349	403	20
21	0	3	10	22	37	56	79	106	136	171	210	252	299	349	404	21
22	0	3	11	22	37	56	79	106	137	172	211	253	300	350	405	22
23	0	3	11	22	37	56	80	107	138	172	211	254	301	351	406	23
24	0	3	11	22	38	57	80	107	138	173	212	255	301	352	407	24
25	0	3	11	22	38	57	80	108	139	174	213	255	302	353	408	25
26	0	4	11	23	38	58	81	108	139	174	213	256	303	354	408	26
27	0	4	11	23	38	58	81	109	140	175	214	257	304	355	409	27
28	0	4	11	23	39	58	82	109	140	175	215	258	305	356	410	28
29	0	4	12	23	39	59	82	110	141	176	215	258	305	356	411	29
30	0	4	12	24	39	59	83	110	141	177	216	259	306	357	412	30
31	0	4	12	24	40	59	83	110	142	177	217	260	307	358	413	31
32	0	4	12	24	40	60	83	111	143	178	217	261	308	359	414	32
33	0	4	12	24	40	60	84	111	143	179	218	261	309	360	415	33
34	0	4	12	25	40	60	84	112	144	179	219	262	310	361	416	34
35	0	4	13	25	41	61	85	112	144	180	219	263	310	362	417	35
36	0	5	13	25	41	61	85	113	145	180	220	264	311	363	418	36
37	0	5	13	25	41	61	86	113	145	181	221	264	312	363	419	37
38	0	5	13	25	42	62	86	114	146	182	222	265	313	364	420	38
39	0	5	13	26	42	62	86	114	146	182	222	266	314	365	421	39
40	0	5	14	26	42	63	87	115	147	183	223	267	315	366	422	40
41	0	5	14	26	43	63	87	115	148	184	224	267	315	367	423	41
42	1	5	14	26	43	63	88	116	148	184	224	268	316	368	424	42
43	1	5	14	27	43	64	88	116	149	185	225	269	317	369	425	43
44	1	5	14	27	44	64	89	117	149	186	226	270	318	370	426	44
45	1	6	14	27	44	64	89	117	150	186	226	271	319	371	427	45
46	1	6	15	27	44	65	89	118	150	187	227	271	319	372	428	46
47	1	6	15	28	44	65	90	118	151	187	228	272	320	372	429	47
48	1	6	15	28	45	66	90	119	152	188	229	273	321	373	430	48
49	1	6	15	28	45	66	91	120	152	189	229	274	322	374	430	49
50	1	6	15	28	45	66	91	120	153	189	230	274	323	375	431	50
51	1	6	15	29	46	67	92	121	153	190	231	275	324	376	432	51
52	1	6	16	29	46	67	92	121	154	191	231	276	325	377	433	52
53	1	7	16	29	46	68	93	122	154	191	232	277	325	378	434	53
54	1	7	16	29	47	68	93	122	155	192	233	278	326	379	435	54
55	1	7	16	30	47	68	93	123	156	193	234	278	327	380	436	55
56	1	7	16	30	47	69	94	123	156	193	234	279	328	381	437	56
57	1	7	17	30	48	69	94	124	157	194	235	280	329	382	438	57
58	1	7	17	30	48	69	95	124	157	195	236	281	330	382	439	58
59	1	7	17	31	48	70	95	125	158	195	236	281	330	383	440	59
60	2	7	17	31	49	70	96	125	159	196	237	282	331	384	441	60

Reduction to the Meridian. Part I.

S.	M. 15	M. 16	M. 17	M. 18	M. 19	M. 20	M. 21	M. 22	M. 23	M. 24	M. 25	M. 26	M. 27	S.
0	441″	502″	567″	635″	708″	784″	865″	949″	1037″	1129″	1225″	1325″	1429″	0
1	442	503	568	636	709	786	866	951	1039	1131	1227	1327	1431	1
2	443	504	569	638	710	787	868	952	1040	1133	1229	1329	1433	2
3	444	505	570	639	712	788	869	953	1042	1134	1230	1331	1434	3
4	445	506	571	640	713	790	870	955	1043	1136	1232	1332	1436	4
5	446	507	572	641	714	791	872	956	1045	1137	1234	1334	1438	5
6	447	508	573	642	715	792	873	958	1046	1139	1235	1336	1440	6
7	448	509	574	644	717	794	874	959	1048	1140	1237	1337	1442	7
8	449	510	576	645	718	795	876	961	1049	1142	1239	1339	1443	8
9	450	511	577	646	719	796	877	962	1051	1144	1240	1341	1445	9
10	451	513	578	647	720	798	879	963	1052	1145	1242	1342	1447	10
11	452	514	579	648	722	799	880	965	1054	1147	1243	1344	1449	11
12	453	515	580	650	723	800	881	966	1055	1148	1245	1346	1451	12
13	454	516	581	651	724	802	883	968	1057	1150	1247	1348	1452	13
14	455	517	582	652	725	803	884	969	1058	1152	1248	1349	1454	14
15	456	518	583	653	727	804	886	971	1060	1153	1250	1351	1456	15
16	457	519	585	654	728	806	887	972	1062	1155	1252	1353	1458	16
17	458	520	586	656	729	807	888	974	1063	1156	1253	1354	1459	17
18	459	521	587	657	730	808	890	975	1065	1158	1255	1356	1461	18
19	460	522	588	658	732	809	891	977	1066	1159	1257	1358	1463	19
20	461	523	589	659	733	811	893	978	1068	1161	1258	1360	1465	20
21	462	524	590	660	734	812	894	979	1069	1163	1260	1361	1466	21
22	463	525	591	662	736	813	895	981	1071	1164	1262	1363	1468	22
23	464	526	593	663	737	815	897	982	1072	1166	1263	1365	1470	23
24	465	527	594	664	738	816	898	984	1074	1167	1265	1367	1472	24
25	466	528	595	665	739	817	900	985	1075	1169	1267	1368	1474	25
26	467	530	596	666	741	819	901	987	1077	1171	1268	1370	1475	26
27	468	531	597	668	742	820	902	988	1078	1172	1270	1372	1477	27
28	469	532	598	669	743	821	904	990	1080	1174	1272	1373	1479	28
29	470	533	599	670	744	823	905	991	1081	1175	1273	1375	1481	29
30	471	534	601	671	746	824	907	993	1083	1177	1275	1377	1483	30
31	472	535	602	672	747	825	908	994	1084	1179	1277	1379	1484	31
32	473	536	603	674	748	827	909	996	1086	1180	1278	1380	1486	32
33	474	537	604	675	749	828	911	997	1087	1182	1280	1382	1488	33
34	475	538	605	676	751	829	912	999	1089	1183	1282	1384	1490	34
35	476	539	606	677	752	831	914	1000	1091	1185	1283	1385	1492	35
36	477	540	607	678	753	832	915	1002	1092	1187	1285	1387	1493	36
37	478	541	609	680	755	833	916	1003	1094	1188	1287	1389	1495	37
38	479	543	610	681	756	835	918	1005	1095	1190	1288	1391	1497	38
39	480	544	611	682	757	836	919	1006	1097	1191	1290	1392	1499	39
40	481	545	612	683	758	838	921	1008	1098	1193	1292	1394	1501	40
41	482	546	613	685	760	839	922	1009	1100	1195	1293	1396	1502	41
42	483	547	614	686	761	840	923	1010	1101	1196	1295	1398	1504	42
43	484	548	615	687	762	842	925	1012	1103	1198	1297	1399	1506	43
44	485	549	617	688	764	843	926	1013	1105	1199	1298	1401	1508	44
45	486	550	618	689	765	844	928	1015	1106	1201	1300	1403	1510	45
46	487	551	619	691	766	846	929	1016	1108	1203	1302	1405	1512	46
47	488	552	620	692	767	847	931	1018	1109	1204	1303	1406	1513	47
48	490	553	621	693	769	848	932	1019	1111	1206	1305	1408	1515	48
49	491	555	622	694	770	850	933	1021	1112	1208	1307	1410	1517	49
50	492	556	624	696	771	851	935	1022	1114	1209	1309	1412	1519	50
51	493	557	625	697	773	852	936	1024	1115	1211	1310	1413	1521	51
52	494	558	626	698	774	854	938	1025	1117	1212	1312	1415	1522	52
53	495	559	627	699	775	855	939	1027	1118	1214	1314	1417	1524	53
54	496	560	628	700	777	857	940	1028	1120	1216	1315	1419	1526	54
55	497	561	629	702	778	858	942	1030	1122	1217	1317	1420	1528	55
56	498	562	631	703	779	859	943	1031	1123	1219	1319	1422	1530	56
57	499	563	632	704	781	861	945	1033	1125	1221	1320	1424	1532	57
58	500	564	633	705	782	862	946	1034	1126	1222	1322	1426	1533	58
59	501	566	634	707	783	863	948	1036	1128	1224	1324	1427	1535	59
60	502	567	635	708	784	865	949	1037	1129	1225	1325	1429	1537	60

Part I. Reduction to the Meridian.

S.	M. 28	M. 29	M. 30	M. 31	M. 32	M. 33	M. 34	M. 35	S.
	″	″	″	″	″	″	″	″	
0	1537	1649	1764	1884	2007	2134	2265	2400	0
1	1539	1650	1766	1886	2009	2136	2267	2402	1
2	1541	1652	1768	1888	2011	2138	2270	2405	2
3	1542	1654	1770	1890	2013	2141	2272	2407	3
4	1544	1656	1772	1892	2015	2143	2274	2409	4
5	1546	1658	1774	1894	2017	2145	2276	2412	5
6	1548	1660	1776	1896	2019	2147	2278	2414	6
7	1550	1662	1778	1898	2022	2149	2281	2416	7
8	1552	1664	1780	1900	2024	2151	2283	2418	8
9	1553	1666	1782	1902	2026	2153	2285	2421	9
10	1555	1668	1784	1904	2028	2156	2287	2423	10
11	1557	1669	1786	1906	2030	2158	2290	2425	11
12	1559	1671	1788	1908	2032	2160	2292	2428	12
13	1561	1673	1790	1910	2034	2162	2294	2430	13
14	1563	1675	1792	1912	2036	2164	2296	2432	14
15	1565	1677	1794	1914	2038	2166	2299	2435	15
16	1568	1679	1796	1916	2040	2169	2301	2437	16
17	1568	1681	1798	1918	2043	2171	2303	2439	17
18	1570	1683	1800	1920	2045	2173	2305	2441	18
19	1572	1685	1802	1922	2047	2175	2308	2444	19
20	1574	1687	1804	1924	2049	2177	2310	2446	20
21	1576	1689	1805	1926	2051	2179	2312	2448	21
22	1578	1691	1807	1928	2053	2182	2314	2451	22
23	1579	1692	1809	1930	2055	2184	2316	2453	23
24	1581	1694	1811	1932	2057	2186	2319	2455	24
25	1583	1696	1813	1935	2059	2188	2321	2458	25
26	1585	1698	1815	1937	2062	2190	2323	2460	26
27	1587	1700	1817	1939	2064	2193	2325	2462	27
28	1589	1702	1819	1941	2066	2195	2328	2464	28
29	1590	1704	1821	1943	2068	2197	2330	2467	29
30	1592	1706	1823	1945	2070	2199	2332	2469	30
31	1594	1708	1825	1947	2072	2201	2334	2471	31
32	1596	1710	1827	1949	2074	2203	2337	2474	32
33	1598	1712	1829	1951	2076	2206	2339	2476	33
34	1600	1714	1831	1953	2078	2208	2341	2478	34
35	1602	1715	1833	1955	2081	2210	2343	2481	35
36	1604	1717	1835	1957	2083	2212	2346	2483	36
37	1605	1719	1837	1959	2085	2214	2348	2485	37
38	1607	1721	1839	1961	2087	2217	2350	2488	38
39	1609	1723	1841	1963	2089	2219	2353	2490	39
40	1611	1725	1843	1965	2091	2221	2355	2492	40
41	1613	1727	1845	1967	2093	2223	2357	2495	41
42	1615	1729	1847	1969	2095	2225	2359	2497	42
43	1617	1731	1849	1972	2098	2228	2361	2499	43
44	1619	1733	1851	1974	2100	2230	2364	2502	44
45	1620	1735	1853	1976	2102	2232	2366	2504	45
46	1622	1737	1855	1978	2104	2234	2368	2506	46
47	1624	1739	1857	1980	2106	2236	2371	2509	47
48	1626	1741	1859	1982	2108	2239	2373	2511	48
49	1628	1743	1861	1984	2110	2241	2375	2513	49
50	1630	1745	1863	1986	2113	2243	2377	2516	50
51	1632	1747	1865	1988	2115	2245	2380	2518	51
52	1634	1749	1867	1990	2117	2247	2382	2520	52
53	1635	1750	1869	1992	2119	2250	2384	2523	53
54	1637	1752	1871	1994	2121	2252	2386	2525	54
55	1639	1754	1873	1996	2123	2254	2389	2527	55
56	1641	1756	1875	1999	2126	2256	2391	2530	56
57	1643	1758	1877	2001	2128	2258	2393	2532	57
58	1645	1760	1879	2003	2130	2261	2396	2534	58
59	1647	1762	1882	2005	2132	2263	2398	2537	59
60	1649	1764	1884	2007	2134	2265	2400	2539	60

Part II.

M.	S.	+	M.	S.	+	M.	S.	+
0	0	0″.00	14	30	0″.41	24	50	3″.55
1	0	0.00		40	0.43	25	0	3.64
2	0	0.00		50	0.45		10	3.74
3	0	0.00	15	0	0.47		20	3.84
4	0	0.00		10	0.49		30	3.94
5	0	0.01		20	0.52		40	4.05
	10	0.01		30	0.54		50	4.15
	20	0.01		40	0.56	26	0	4.26
	30	0.01		50	0.59		10	4.37
	40	0.01	16	0	0.61		20	4.48
	50	0.01		10	0.64		30	4.60
6	0	0.01		20	0.67		40	4.72
	10	0.01		30	0.69		50	4.83
	20	0.01		40	0.72	27	0	4.96
	30	0.02		50	0.75		10	5.08
	40	0.02	17	0	0.78		20	5.20
	50	0.02		10	0.81		30	5.33
7	0	0.02		20	0.84		40	5.46
	10	0.02		30	0.88		50	5.60
	20	0.03		40	0.91	28	0	5.73
	30	0.03		50	0.95		10	5.87
	40	0.03	18	0	0.98		20	6.01
	50	0.04		10	1.02		30	6.15
8	0	0.04		20	1.06		40	6.30
	10	0.04		30	1.09		50	6.44
	20	0.05		40	1.13	29	0	6.59
	30	0.05		50	1.18		10	6.75
	40	0.05	19	0	1.22		20	6.90
	50	0.06		10	1.26		30	7.06
9	0	0.06		20	1.30		40	7.22
	10	0.07		30	1.35		50	7.38
	20	0.07		40	1.40	30	0	7.55
	30	0.08		50	1.44		10	7.62
	40	0.08	20	0	1.49		20	7.89
	50	0.09		10	1.54		30	8.06
10	0	0.09		20	1.60		40	8.24
	10	0.10		30	1.65		50	8.42
	20	0.11		40	1.70	31	0	8.61
	30	0.11		50	1.76		10	8.79
	40	0.12	21	0	1.82		20	8.98
	50	0.13		10	1.87		30	9.17
11	0	0.14		20	1.93		40	9.37
	10	0.15		30	1.99		50	9.57
	20	0.15		40	2.06	32	0	9.77
	30	0.16		50	2.12		10	9.97
	40	0.17	22	0	2.19		20	10.18
	50	0.18		10	2.25		30	10.39
12	0	0.19		20	2.32		40	10.61
	10	0.21		30	2.39		50	10.82
	20	0.22		40	2.46	33	0	11.04
	30	0.23		50	2.54		10	11.27
	40	0.24	23	0	2.61		20	11.50
	50	0.25		10	2.69		30	11.73
13	0	0.27		20	2.77		40	11.96
	10	0.28		30	2.85		50	12.20
	20	0.30		40	2.93	34	0	12.44
	30	0.31		50	3.01		20	12.94
	40	0.33	24	0	3.10		40	13.45
	50	0.34		10	3.18	35	0	13.97
14	0	0.36		20	3.27		20	14.51
	10	0.38		30	3.36		40	15.06
	20	0.39		40	3.45	36	0	15.63

Length of a Degree in Latitude and Longitude.

Lat.	Deg. of Long.		Deg. of Lat.		Lat.	Deg. of Long.		Deg. of Lat.	
°	Stat. miles.	Naut. miles.	Stat. miles.	Naut. miles.	°	Stat. miles.	Naut. miles.	Stat. miles.	Naut. miles.
0	69.160	60.000	68.698	59.600	45	48.986	42.498	69.044	59.899
2	.119	59.964	.699	.601	47	47.251	40.993	.068	.920
4	68.992	.855	.702	.603	49	45.459	39.439	.092	.941
6	.783	.673	.706	.607	51	43.611	37.835	.116	.962
8	.491	.419	.712	.612	53	41.710	36.186	.140	.982
10	.116	.093	.719	.618	55	39.758	34.491	.162	60.002
12	67.659	58.697	.728	.625	57	37.756	32.755	.184	.022
14	.120	.229	.738	.634	59	35.707	30.979	.206	.041
16	66.499	57.690	.750	.645	61	33.615	29.164	.228	.059
18	65.797	.081	.764	.657	63	31.481	27.311	.248	.077
20	.015	56.404	.779	.669	65	29.308	25.425	.268	.094
22	64.154	55.657	.795	.683	67	27.100	23.509	.286	.110
24	63.216	54.843	.813	.699	69	24.857	21.564	.302	.124
26	62.201	53.962	.831	.715	71	22.582	19.593	.318	.137
28	61.110	.016	.850	.731	73	20.282	17.597	.333	.149
30	59.944	52.005	.870	.749	75	17.956	15.578	.345	.161
32	58.706	50.931	.892	.767	77	15.607	13.539	.357	.171
34	57.396	49.794	.914	.786	79	13.238	11.484	.367	.179
36	56.016	48.597	.936	.806	81	10.853	9.417	.375	.186
38	54.568	47.340	.959	.826	83	8.456	7.338	.381	.192
40	53.053	46.026	.983	.846	85	6.048	5.248	.387	.196
42	51.473	44.656	69.007	.866	87	3.632	3.151	.390	.199
44	49.830	43.231	.031	.888	89	1.211	1.050	.392	.201

TABLE 20c.

TRUE BEARING OF THE POLE STAR.

(East of meridian when sidereal time is between 13h. 18m. and 1h. 18m. West of meridian when sidereal time is between 1h. 18m. and 13h. 18m.)

Sidereal time.	Latitude North.					Sidereal time.	Sidereal time.	Latitude North.					Sidereal time.
	5°	20°	30°	40°	50°			5°	20°	30°	40°	50°	
h. m.	° ′	° ′	° ′	° ′	° ′	h. m.	h. m.	° ′	° ′	° ′	° ′	° ′	h. m.
0 0	N.0 26	N.0 28	N.0 29	N.0 35	N.0 40	12 0	6 30	N.1 15	N.1 22	N.1 30	N.1 38	N.2 0	18 30
0 30	0 16	0 18	0 19	0 20	0 26	12 30	7 0	1 17	1 23	1 29	1 39	1 55	19 0
1 0	0 6	0 6	0 6	0 7	0 8	13 0	7 30	1 17	1 23	1 29	1 39	1 55	19 30
1 30	0 4	0 4	0 4	0 5	0 6	13 30	8 0	1 16	1 22	1 27	1 37	1 54	20 0
2 0	0 14	0 15	0 16	0 17	0 22	14 0	8 30	1 13	1 20	1 26	1 34	1 50	20 30
2 30	0 24	0 26	0 28	0 31	0 38	14 30	9 0	1 9	1 16	1 23	1 29	1 43	21 0
3 0	0 33	0 36	0 38	0 43	0 53	15 0	9 30	1 5	1 11	1 17	1 23	1 37	21 30
3 30	0 42	0 46	0 50	0 55	1 7	15 30	10 0	0 59	1 4	1 9	1 15	1 28	22 0
4 0	0 50	0 55	1 0	1 5	1 20	16 0	10 30	0 51	0 56	1 1	1 6	1 17	22 30
4 30	0 57	1 2	1 7	1 14	1 32	16 30	11 0	0 44	0 48	0 52	0 56	1 6	23 0
5 0	1 3	1 9	1 15	1 22	1 40	17 0	11 30	0 35	0 38	0 31	0 45	0 52	23 30
5 30	1 9	1 15	1 22	1 30	1 50	17 30	12 0	0 26	0 28	0 29	0 35	0 40	24 0
6 0	1 13	1 20	1 27	1 35	1 56	18 0							

Correction for Pole Star.

Mer. R.A.	Lat. 30°.		Lat. 50°.		Lat. 70°.	
	1891.	1901.	1891.	1901.	1891.	1901.
h. m.	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″
0 0	−1 11 51	−1 10 26	−1 11 47	−1 10 22	−1 11 38	−1 10 13
0 10	−1 12 55	−1 11 29	−1 12 52	−1 11 26	−1 12 46	−1 11 18
0 20	−1 13 51	−1 12 24	−1 13 49	−1 12 21	−1 13 44	−1 12 16
0 30	−1 14 38	−1 13 12	−1 14 37	−1 13 10	−1 14 33	−1 13 7
0 40	−1 15 17	−1 13 52	−1 15 16	−1 13 51	−1 15 13	−1 13 48
0 50	−1 15 46	−1 14 22	−1 15 46	−1 14 22	−1 15 45	−1 14 21
1 0	−1 16 8	−1 14 43	−1 16 7	−1 14 43	−1 16 7	−1 14 42
1 10	−1 16 20	−1 14 56	−1 16 20	−1 14 56	−1 16 19	−1 14 55
1 20	−1 16 23	−1 15 0	−1 16 23	−1 15 00	−1 16 23	−1 14 59
1 30	−1 16 18	−1 14 56	−1 16 18	−1 14 56	−1 16 17	−1 14 55
1 40	−1 16 3	−1 14 43	−1 16 3	−1 14 43	−1 16 2	−1 14 42
1 50	−1 15 40	−1 14 22	−1 15 40	−1 14 22	−1 15 38	−1 14 21
2 0	−1 15 9	−1 13 51	−1 15 8	−1 13 50	−1 15 5	−1 13 48
2 10	−1 14 28	−1 13 11	−1 14 27	−1 13 9	−1 14 23	−1 13 5
2 20	−1 13 39	−1 12 23	−1 13 37	−1 12 20	−1 13 31	−1 12 14
2 30	−1 12 42	−1 11 29	−1 12 38	−1 11 26	−1 12 31	−1 11 20
2 40	−1 11 35	−1 10 25	−1 11 32	−1 10 21	−1 11 22	−1 10 13
2 50	−1 10 21	−1 9 12	−1 10 16	−1 9 7	−1 10 4	−1 8 53
3 0	−1 8 59	−1 7 51	−1 8 53	−1 7 48	−1 8 38	−1 7 34
3 10	−1 7 28	−1 6 24	−1 7 21	−1 6 19	−1 7 4	−1 6 2
3 20	−1 5 50	−1 4 48	−1 5 42	−1 4 41	−1 5 22	−1 4 21
3 30	−1 4 4	−1 3 5	−1 3 55	−1 2 56	−1 3 32	−1 2 33
3 40	−1 2 11	−1 1 12	−1 2 1	−1 1 2	−1 1 34	−1 0 38
3 50	−1 0 11	−0 59 18	−0 59 59	−0 59 6	−0 59 30	−0 58 34
4 0	−0 58 4	−0 57 15	−0 57 51	−0 57 3	−0 57 18	−0 56 31
4 10	−0 55 50	−0 55 5	−0 55 36	−0 54 52	−0 54 59	−0 54 16
4 20	−0 53 30	−0 52 48	−0 53 14	−0 52 34	−0 52 34	−0 51 54
4 30	−0 51 3	−0 50 24	−0 50 46	−0 50 8	−0 50 3	−0 49 26
4 40	−0 48 31	−0 47 56	−0 48 13	−0 47 39	−0 47 26	−0 46 53
4 50	−0 45 53	−0 45 20	−0 45 33	−0 45 0	−0 44 43	−0 44 9
5 0	−0 43 10	−0 42 42	−0 42 49	−0 42 22	−0 41 56	−0 41 31
5 10	−0 40 22	−0 39 58	−0 40 0	−0 39 38	−0 39 3	−0 38 42
5 20	−0 37 30	−0 37 9	−0 37 6	−0 36 48	−0 36 6	−0 35 48
5 30	−0 34 33	−0 34 16	−0 34 8	−0 33 53	−0 33 6	−0 32 50
5 40	−0 31 32	−0 31 19	−0 31 6	−0 30 54	−0 30 1	−0 29 48
5 50	−0 28 28	−0 28 17	−0 28 1	−0 27 50	−0 26 53	−0 26 43
6 0	−0 25 20	−0 25 14	−0 24 52	−0 24 47	−0 23 42	−0 23 40
6 10	−0 22 10	−0 22 7	−0 21 41	−0 21 40	−0 20 29	−0 20 31
6 20	−0 18 57	−0 18 56	−0 18 27	−0 18 31	−0 17 13	−0 17 20
6 30	−0 15 42	−0 15 47	−0 15 12	−0 15 18	−0 13 56	−0 14 6
6 40	−0 12 25	−0 12 34	−0 11 54	−0 12 4	−0 10 38	−0 10 49
6 50	−0 9 7	−0 9 19	−0 8 36	−0 8 49	−0 7 18	−0 7 33
7 0	−0 5 47	−0 6 4	−0 5 17	−0 5 34	−0 3 58	−0 4 18
7 10	−0 2 28	−0 2 48	−0 1 57	−0 2 18	−0 0 38	−0 1 1
7 20	+0 0 52	+0 0 28	+0 1 24	+0 0 58	+0 2 43	+0 2 15
7 30	+0 4 12	+0 3 44	+0 4 43	+0 4 14	+0 6 2	+0 5 31
7 40	+0 7 31	+0 7 0	+0 8 2	+0 7 30	+0 9 21	+0 8 46
7 50	+0 10 50	+0 10 15	+0 11 20	+0 10 45	+0 12 38	+0 12 1

Correction for Pole Star.

Mer. R.A.	Lat. 30°.		Lat. 50°.		Lat. 70°.	
	1891.	1901.	1891.	1901.	1891.	1901.
h. m.	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″
8 0	+0 14 7	+0 13 28	+0 14 37	+0 13 58	+0 15 54	+0 15 13
8 10	+0 17 22	+0 16 41	+0 17 52	+0 17 16	+0 19 7	+0 18 22
8 20	+0 20 36	+0 19 51	+0 21 5	+0 20 19	+0 22 18	+0 21 30
8 30	+0 23 47	+0 22 59	+0 24 15	+0 23 26	+0 25 27	+0 24 35
8 40	+0 26 55	+0 26 4	+0 27 22	+0 26 31	+0 28 32	+0 27 38
8 50	+0 30 0	+0 29 7	+0 30 27	+0 29 34	+0 31 34	+0 30 41
9 0	+0 33 2	+0 32 5	+0 33 27	+0 32 30	+0 34 32	+0 33 36
9 10	+0 35 59	+0 35 0	+0 36 24	+0 35 23	+0 37 26	+0 36 26
9 20	+0 38 53	+0 37 51	+0 39 16	+0 38 12	+0 40 16	+0 39 12
9 30	+0 41 42	+0 40 38	+0 42 4	+0 40 58	+0 43 1	+0 41 54
9 40	+0 44 27	+0 43 20	+0 44 48	+0 43 40	+0 45 41	+0 44 31
9 50	+0 47 6	+0 45 58	+0 47 26	+0 46 18	+0 48 15	+0 47 9
10 0	+0 49 40	+0 48 30	+0 49 59	+0 48 47	+0 50 45	+0 49 33
10 10	+0 52 9	+0 50 56	+0 52 26	+0 51 12	+0 53 9	+0 51 54
10 20	+0 54 31	+0 53 16	+0 54 47	+0 53 30	+0 55 26	+0 54 10
10 30	+0 56 48	+0 55 31	+0 57 2	+0 55 44	+0 57 38	+0 56 20
10 40	+0 58 57	+0 57 39	+0 59 10	+0 57 51	+0 59 43	+0 58 23
10 50	+1 1 1	+0 59 30	+1 1 12	+0 59 54	+1 1 41	+1 0 26
11 0	+1 2 57	+1 1 26	+1 3 7	+1 1 48	+1 3 33	+1 2 14
11 10	+1 4 46	+1 3 15	+1 4 55	+1 3 34	+1 5 17	+1 3 57
11 20	+1 6 28	+1 4 57	+1 6 35	+1 5 13	+1 6 55	+1 5 33
11 30	+1 8 2	+1 6 32	+1 8 8	+1 6 45	+1 8 25	+1 7 2
11 40	+1 9 28	+1 7 58	+1 9 34	+1 8 8	+1 9 48	+1 8 22
11 50	+1 10 47	+1 9 22	+1 10 52	+1 9 27	+1 11 3	+1 9 41
12 0	+1 11 58	+1 10 33	+1 12 1	+1 10 37	+1 12 10	+1 10 45
12 10	+1 13 0	+1 11 29	+1 13 3	+1 11 26	+1 13 10	+1 11 18
12 20	+1 13 55	+1 12 24	+1 13 57	+1 12 21	+1 14 2	+1 12 16
12 30	+1 14 41	+1 13 12	+1 14 42	+1 13 10	+1 14 46	+1 13 7
12 40	+1 15 18	+1 13 52	+1 15 19	+1 13 51	+1 15 21	+1 13 48
12 50	+1 15 47	+1 14 22	+1 15 48	+1 14 22	+1 15 49	+1 14 21
13 0	+1 16 8	+1 14 43	+1 16 8	+1 14 42	+1 16 8	+1 14 43
13 10	+1 16 20	+1 14 56	+1 16 20	+1 14 56	+1 16 20	+1 14 56
13 20	+1 16 23	+1 15 0	+1 16 23	+1 15 0	+1 16 23	+1 15 0
13 30	+1 16 18	+1 14 56	+1 16 18	+1 14 56	+1 16 18	+1 14 56
13 40	+1 16 4	+1 14 43	+1 16 4	+1 14 43	+1 16 5	+1 14 43
13 50	+1 15 41	+1 14 22	+1 15 42	+1 14 22	+1 15 43	+1 14 22
14 0	+1 15 10	+1 13 53	+1 15 11	+1 13 54	+1 15 14	+1 13 56
14 10	+1 14 31	+1 13 15	+1 14 32	+1 13 17	+1 14 36	+1 13 21
14 20	+1 13 43	+1 12 29	+1 13 45	+1 12 32	+1 13 51	+1 12 38
14 30	+1 12 47	+1 11 35	+1 12 50	+1 13 38	+1 12 57	+1 11 44
14 40	+1 11 42	+1 10 33	+1 11 46	+1 10 37	+1 11 56	+1 10 45
14 50	+1 10 30	+1 9 22	+1 10 35	+1 9 27	+1 10 46	+1 9 41
15 0	+1 9 9	+1 7 58	+1 9 15	+1 8 8	+1 9 29	+1 8 22
15 10	+1 7 41	+1 6 32	+1 7 48	+1 6 45	+1 8 5	+1 7 2
15 20	+1 6 5	+1 4 57	+1 6 13	+1 5 13	+1 6 33	+1 5 33
15 30	+1 4 22	+1 3 15	+1 4 31	+1 3 34	+1 4 54	+1 3 57
15 40	+1 2 31	+1 1 26	+1 2 41	+1 1 48	+1 3 8	+1 2 14
15 50	+1 0 33	+0 59 30	+1 0 45	+0 59 54	+1 1 15	+1 0 24

Correction for Pole Star.

Mer. R.A.	Lat. 30°.		Lat. 50°.		Lat. 70°.	
	1891.	1901.	1891.	1901.	1891.	1901.
h. m.	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″	° ′ ″
16 0	+0 58 28	+0 57 27	+0 58 42	+0 57 51	+0 59 15	+0 58 23
16 10	+0 56 17	+0 55 31	+0 56 32	+0 55 44	+0 57 8	+0 56 20
16 20	+0 53 59	+0 53 16	+0 54 15	+0 53 30	+0 54 55	+0 54 10
16 30	+0 51 36	+0 50 56	+0 51 53	+0 51 12	+0 52 36	+0 51 56
16 40	+0 49 6	+0 48 30	+0 49 24	+0 48 47	+0 50 11	+0 49 33
16 50	+0 46 30	+0 45 58	+0 46 50	+0 46 18	+0 47 41	+0 47 9
17 0	+0 43 50	+0 43 20	+0 44 11	+0 43 40	+0 45 5	+0 44 31
17 10	+0 41 4	+0 40 38	+0 41 27	+0 40 58	+0 42 23	+0 41 54
17 20	+0 38 14	+0 37 51	+0 38 38	+0 38 12	+0 39 37	+0 39 12
17 30	+0 35 19	+0 35 0	+0 35 44	+0 35 23	+0 36 47	+0 36 26
17 40	+0 32 20	+0 32 5	+0 32 46	+0 32 30	+0 33 52	+0 33 36
17 50	+0 29 18	+0 29 7	+0 29 45	+0 29 34	+0 30 53	+0 30 41
18 0	+0 26 12	+0 26 4	+0 26 40	+0 26 31	+0 27 50	+0 27 38
18 10	+0 23 3	+0 22 59	+0 23 32	+0 23 26	+0 24 44	+0 24 35
18 20	+0 19 52	+0 19 51	+0 20 21	+0 20 19	+0 21 35	+0 21 30
18 30	+0 16 38	+0 16 41	+0 17 8	+0 17 10	+0 18 23	+0 18 22
18 40	+0 13 22	+0 13 28	+0 13 52	+0 13 58	+0 15 9	+0 15 13
18 50	+0 10 4	+0 10 15	+0 10 35	+0 10 45	+0 11 53	+0 12 1
19 0	+0 6 46	+0 7 0	+0 7 17	+0 7 30	+0 8 36	+0 8 46
19 10	+0 3 27	+0 3 44	+0 3 58	+0 4 14	+0 5 17	+0 5 31
19 20	+0 0 7	+0 0 28	+0 0 38	+0 0 58	+0 1 57	+0 2 15
19 30	−0 3 13	−0 2 48	−0 2 42	−0 2 18	−0 1 23	−0 1 1
19 40	−0 6 33	−0 6 4	−0 6 2	−0 5 34	−0 4 44	−0 4 18
19 50	−0 9 52	−0 9 19	−0 9 21	−0 8 49	−0 8 4	−0 7 33
20 0	−0 13 10	−0 12 34	−0 12 40	−0 12 4	−0 11 23	−0 10 49
20 10	−0 16 26	−0 15 47	−0 15 57	−0 15 18	−0 14 41	−0 14 6
20 20	−0 19 41	−0 18 56	−0 19 12	−0 18 31	−0 17 58	−0 17 20
20 30	−0 22 53	−0 22 7	−0 22 25	−0 21 40	−0 21 13	−0 20 31
20 40	−0 26 3	−0 25 14	−0 25 36	−0 24 47	−0 24 26	−0 23 40
20 50	−0 29 10	−0 28 17	−0 28 43	−0 27 50	−0 27 36	−0 26 43
21 0	−0 32 14	−0 31 19	−0 31 48	−0 30 54	−0 30 43	−0 29 41
21 10	−0 35 13	−0 34 46	−0 34 49	−0 33 53	−0 33 47	−0 32 50
21 20	−0 38 9	−0 37 9	−0 37 46	−0 36 48	−0 36 47	−0 35 48
21 30	−0 41 1	−0 39 58	−0 40 39	−0 39 38	−0 39 43	−0 38 42
21 40	−0 43 48	−0 42 42	−0 43 27	−0 42 22	−0 42 34	−0 41 31
21 50	−0 46 30	−0 45 20	−0 46 10	−0 45 0	−0 45 21	−0 44 9
22 0	−0 49 6	−0 47 56	−0 48 48	−0 47 39	−0 48 2	−0 46 53
22 10	−0 51 37	−0 50 24	−0 51 20	−0 50 8	−0 50 38	−0 49 26
22 20	−0 54 2	−0 52 48	−0 53 47	−0 52 34	−0 53 8	−0 51 54
22 30	−0 56 21	−0 55 5	−0 56 7	−0 54 52	−0 55 31	−0 54 16
22 40	−0 58 33	−0 57 15	−0 58 20	−0 56 52	−0 57 48	−0 56 31
22 50	−1 0 39	−0 59 6	−1 0 28	−0 59 3	−0 59 59	−0 58 34
23 0	−1 2 38	−1 1 24	−1 2 28	−1 1 4	−1 2 2	−1 0 40
23 10	−1 4 29	−1 3 15	−1 4 20	−1 2 56	−1 3 58	−1 2 33
23 20	−1 6 13	−1 4 57	−1 6 6	−1 4 41	−1 5 46	−1 4 21
23 30	−1 7 50	−1 6 32	−1 7 43	−1 6 19	−1 7 26	−1 6 2
23 40	−1 9 18	−1 7 58	−1 9 13	−1 7 48	−1 8 59	−1 7 34
23 50	−1 10 39	−1 9 12	−1 10 34	−1 9 7	−1 10 23	−1 8 53

Augmentation of the Moon's Horizontal Semi-diameter.

App. Alt.	′ ″ 14 40	′ ″ 15 0	′ ″ 15 20	′ ″ 15 40	′ ″ 16 0	′ ″ 16 20	′ ″ 16 40
°	″	″	″	″	″	″	″
0	0·1	0·1	0·1	0·1	0·1	0·2	0·2
6	1·5	1·6	1·7	1·8	1·9	2·0	2·0
8	2·0	2·1	2·2	2·3	2·4	2·5	2·6
10	2·6	2·7	2·8	2·9	3·0	3·1	3·3
12	3·2	3·3	3·3	3·4	3·6	3·7	3·9
14	3·5	3·6	3·8	3·9	4·1	4·3	4·5
16	3·9	4·1	4·3	4·5	4·7	4·9	5·1
18	4·4	4·6	4·8	5·0	5·2	5·4	5·6
20	4·8	5·0	5·3	5·6	5·8	6·0	6·2
22	5·2	5·5	5·8	6·1	6·3	6·6	6·8
24	5·7	6·0	6·3	6·6	6·8	7·1	7·4
26	6·1	6·4	6·8	7·1	7·4	7·7	8·0
28	6·6	6·9	7·2	7·6	7·9	8·2	8·5
30	7·1	7·4	7·7	8·0	8·4	8·7	9·0
32	7·5	7·8	8·2	8·5	8·9	9·2	9·6
34	7·8	8·2	8·6	9·0	9·3	9·7	10·1
36	8·2	8·6	9·0	9·4	9·9	10·2	10·6
38	8·6	9·0	9·4	9·9	10·3	10·7	11·1
40	9·0	9·4	9·8	10·3	10·7	11·1	11·6
42	9·4	9·8	10·2	10·7	11·2	11·6	12·1
44	9·8	10·2	10·6	11·1	11·6	12·0	12·6
46	10·0	10·5	11·0	11·5	12·0	12·5	13·0
48	10·4	10·9	11·4	11·9	12·4	12·9	13·4
50	10·7	11·2	11·7	12·2	12·8	13·3	13·8
52	11·0	11·5	12·0	12·6	13·1	13·7	14·2
54	11·3	11·8	12·4	12·9	13·5	14·1	14·6
56	11·6	12·1	12·7	13·2	13·8	14·4	14·9
58	11·8	12·4	12·9	13·6	14·2	14·7	15·3
60	12·1	12·7	13·2	13·8	14·5	15·0	15·6
62	12·3	12·9	13·5	14·1	14·7	15·3	15·9
64	12·5	13·1	13·7	14·3	15·0	15·6	16·2
66	12·8	13·4	13·9	14·6	15·2	15·8	16·5
68	12·9	13·5	14·2	14·8	15·4	16·1	16·7
70	13·1	13·7	14·4	15·0	15·7	16·3	16·9
72	13·3	13·9	14·5	15·2	15·8	16·5	17·2
74	13·4	14·0	14·7	15·3	16·0	16·7	17·4
76	13·5	14·1	14·8	15·5	16·2	16·8	17·5
78	13·7	14·3	14·9	15·6	16·3	16·9	17·6
80	13·8	14·4	15·0	15·7	16·4	17·1	17·8
82	13·8	14·4	15·1	15·8	16·5	17·2	17·8
84	13·9	14·5	15·2	15·9	16·5	17·2	17·9
86	13·9	14·5	15·2	15·9	16·6	17·3	18·0
88	14·0	14·6	15·3	15·9	16·6	17·3	18·0
90	14·0	14·6	15·3	16·0	16·7	17·3	18·0

Correction in finding Moon's Meridian Passage.

Longitude W. add. E. subtract.	Diff. Moon's Meridian Passage. 40m	44m	48m	52m	56m	60m	64m	66m
°								
5	1	1	1	1	1	1	1	1
10	1	1	1	1	2	2	2	2
15	2	2	2	2	2	2	3	3
20	2	2	3	3	3	3	4	4
25	3	3	3	4	4	4	4	5
30	3	4	4	4	5	5	5	5
35	4	4	5	5	5	6	6	6
40	4	5	5	6	6	7	7	7
45	5	5	6	6	7	7	8	8
50	6	6	7	7	8	8	9	9
55	6	7	7	8	9	9	10	10
60	7	7	8	9	9	10	11	11
65	7	8	9	9	10	11	12	12
70	8	9	9	10	11	12	12	13
75	8	9	10	11	12	12	13	14
80	9	10	11	12	12	13	14	15
85	9	10	11	12	13	14	15	16
90	10	11	12	13	14	15	16	16
95	11	12	13	14	15	16	17	17
100	11	12	13	14	16	17	18	18
105	12	13	14	15	16	17	19	19
110	12	13	15	16	17	18	20	20
115	13	14	15	17	18	19	20	21
120	13	15	16	17	19	20	21	22
125	14	15	17	18	19	21	22	23
130	14	16	17	19	20	22	23	24
135	15	16	18	19	21	22	24	25
140	16	17	19	20	22	23	25	26
145	16	18	19	21	23	24	26	27
150	17	18	20	22	23	25	27	27
155	17	19	21	22	24	26	28	28
160	18	20	21	23	25	27	28	29
165	18	20	22	24	26	27	29	30
170	19	21	23	25	26	28	30	31
175	19	21	23	25	27	29	31	32
180	20	22	24	26	28	30	32	33

Correction of the Moon's Altitude, and the Aux. Angle A. (4° and 5°)

App Alt.	Minutes of Moon's Hor. Paralax. 54′		55′		56′		57′		58′		59′		60′		61′		Seconds of H. P.		
	"	Cor.	A																
4°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°			
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″			
0′	42 1	1 17	43 1	1 20	44 1	1 23	45 0	1 26	46 0	1 29	47 0	1 32	48 0	1 34	49 0	1 37	1	1	0
2	42 5	1 18	43 5	1 21	44 5	1 24	45 4	1 27	46 4	1 30	47 4	1 33	48 4	1 36	49 4	1 38	2	2	0
4	42 9	1 19	43 9	1 22	44 9	1 25	45 9	1 28	46 8	1 31	47 8	1 34	48 8	1 37	49 8	1 40	3	3	0
6	42 13	1 20	43 13	1 23	44 13	1 26	45 13	1 29	46 12	1 32	47 12	1 35	48 12	1 38	49 12	1 41	4	4	0
8	42 17	1 21	43 17	1 24	44 17	1 27	45 17	1 30	46 17	1 33	47 16	1 36	48 16	1 39	49 16	1 42	5	5	0
10	42 21	1 22	43 21	1 25	44 21	1 28	45 21	1 31	46 21	1 34	47 20	1 37	48 20	1 40	49 20	1 43	6	6	0
12	42 25	1 23	43 25	1 27	44 25	1 29	45 25	1 32	46 25	1 35	47 24	1 38	48 24	1 41	49 24	1 44	7	7	0
14	42 29	1 25	43 29	1 28	44 29	1 31	45 29	1 34	46 29	1 37	47 29	1 40	48 28	1 43	49 28	1 46	8	8	0
16	42 33	1 26	43 33	1 29	44 33	1 32	45 33	1 35	46 33	1 38	47 33	1 41	48 32	1 44	49 32	1 47	9	9	1
18	42 37	1 27	43 37	1 30	44 37	1 33	45 37	1 36	46 37	1 39	47 37	1 42	48 37	1 45	49 36	1 48	10	10	1
20	42 41	1 28	43 41	1 31	44 41	1 34	45 41	1 37	46 41	1 40	47 41	1 43	48 41	1 46	49 40	1 49	11	11	1
22	42 45	1 29	43 45	1 32	44 45	1 35	45 45	1 38	46 45	1 41	47 44	1 44	48 44	1 47	49 44	1 51	12	12	1
24	42 49	1 30	43 49	1 33	44 48	1 36	45 48	1 39	46 48	1 42	47 48	1 45	48 48	1 49	49 48	1 52	13	13	1
26	42 52	1 31	43 52	1 34	44 52	1 37	45 52	1 40	46 52	1 43	47 52	1 47	48 52	1 50	49 51	1 53	14	14	1
28	42 56	1 32	43 56	1 35	44 56	1 38	45 56	1 41	46 55	1 45	47 55	1 48	48 55	1 51	49 55	1 54	15	15	1
30	43 0	1 33	44 0	1 36	44 59	1 39	45 59	1 43	46 59	1 46	47 59	1 49	48 59	1 52	49 59	1 55	16	16	1
32	43 3	1 34	44 3	1 37	45 3	1 41	46 3	1 44	47 3	1 47	48 3	1 50	49 2	1 53	50 2	1 57	17	17	1
34	43 7	1 35	44 7	1 38	45 7	1 42	46 7	1 45	47 6	1 48	48 6	1 51	49 6	1 55	50 6	1 58	18	18	1
36	43 11	1 36	44 11	1 40	45 10	1 43	46 10	1 46	47 10	1 49	48 10	1 52	49 10	1 56	50 10	1 59	19	19	1
38	43 14	1 37	44 14	1 41	45 14	1 44	46 14	1 47	47 14	1 50	48 13	1 54	49 13	1 57	50 13	2 0	20	20	2
40	43 18	1 38	44 18	1 42	45 18	1 45	46 17	1 48	47 17	1 51	48 17	1 55	49 17	1 58	50 17	2 1	21	21	2
42	43 21	1 39	44 21	1 43	45 21	1 46	46 21	1 49	47 21	1 53	48 20	1 56	49 20	1 59	50 20	2 3	22	22	2
44	43 24	1 41	44 24	1 44	45 24	1 47	46 24	1 50	47 24	1 54	48 24	1 57	49 23	2 0	50 23	2 4	23	23	2
46	43 28	1 42	44 28	1 45	45 27	1 48	46 27	1 52	47 27	1 55	48 27	1 58	49 27	2 2	50 26	2 5	24	24	2
48	43 31	1 43	44 31	1 46	45 31	1 49	46 30	1 53	47 30	1 56	48 30	1 59	49 30	2 3	50 30	2 6	25	25	2
50	43 34	1 44	44 34	1 47	45 34	1 50	46 34	1 54	47 33	1 57	48 33	2 1	49 33	2 4	50 33	2 7	26	26	2
52	43 37	1 45	44 37	1 48	45 37	1 52	46 37	1 55	47 37	1 58	48 36	2 2	49 36	2 5	50 36	2 9	27	27	2
54	43 41	1 46	44 40	1 49	45 40	1 53	46 40	1 56	47 40	2 0	48 40	2 3	49 40	2 6	50 39	2 10	28	28	2
56	43 44	1 47	44 44	1 50	45 44	1 54	46 43	1 57	47 43	2 1	48 43	2 4	49 43	2 8	50 43	2 11	29	29	2
58	43 47	1 48	44 47	1 51	45 47	1 55	46 47	1 58	47 46	2 2	48 46	2 5	49 46	2 9	50 46	2 12	30	30	2

5°	54′		55′		56′		57′		58′		59′		60′		61′		31	31	2
0′	43 50	1 49	44 50	1 52	45 50	1 56	46 50	1 59	47 50	2 3	48 49	2 6	49 49	2 10	50 49	2 13	32	32	2
2	43 53	1 50	44 53	1 54	45 53	1 57	46 53	2 1	47 53	2 4	48 52	2 8	49 52	2 11	50 52	2 15	33	33	2
4	43 56	1 51	44 56	1 55	45 56	1 58	46 56	2 2	47 55	2 5	48 55	2 9	49 55	2 12	50 55	2 16	34	34	2
6	43 59	1 52	44 59	1 56	45 59	1 59	46 59	2 3	47 58	2 6	48 58	2 10	49 58	2 14	50 58	2 17	35	35	3
8	44 2	1 53	45 2	1 57	46 2	2 0	47 1	2 4	48 1	2 8	49 1	2 11	50 1	2 15	51 1	2 18	36	36	3
10	44 5	1 54	45 5	1 58	46 5	2 2	47 4	2 5	48 4	2 9	49 4	2 12	50 4	2 16	51 4	2 20	37	37	3
12	44 8	1 55	45 8	1 59	46 8	2 3	47 7	2 6	48 7	2 10	49 7	2 14	50 7	2 17	51 7	2 21	38	38	3
14	44 11	1 56	45 11	2 0	46 10	2 4	47 10	2 7	48 10	2 11	49 10	2 15	50 10	2 18	51 9	2 22	39	39	3
16	44 14	1 58	45 14	2 1	46 13	2 5	47 13	2 9	48 13	2 12	49 13	2 16	50 13	2 20	51 12	2 23	40	40	3
18	44 17	1 59	45 17	2 2	46 16	2 6	47 16	2 10	48 16	2 13	49 16	2 17	50 15	2 21	51 15	2 24	41	41	3
20	44 20	2 0	45 19	2 3	46 19	2 7	47 19	2 11	48 19	2 14	49 19	2 18	50 18	2 22	51 18	2 26	42	42	3
22	44 22	2 1	45 23	2 4	46 22	2 8	47 22	2 12	48 21	2 16	49 21	2 19	50 21	2 23	51 21	2 27	43	43	3
24	44 25	2 2	45 25	2 6	46 25	2 9	47 24	2 13	48 24	2 17	49 24	2 21	50 24	2 24	51 24	2 28	44	44	3
26	44 27	2 3	45 28	2 7	46 27	2 10	47 27	2 14	48 27	2 18	49 27	2 22	50 26	2 25	51 26	2 29	45	45	3
28	44 31	2 4	45 31	2 8	46 30	2 12	47 30	2 15	48 30	2 19	49 29	2 23	50 29	2 27	51 29	2 31	46	46	3
30	44 33	2 5	45 33	2 9	46 33	2 13	47 33	2 17	48 32	2 20	49 32	2 24	50 32	2 28	51 32	2 32	47	47	3
32	44 36	2 6	45 36	2 10	46 36	2 14	47 35	2 18	48 35	2 21	49 35	2 25	50 34	2 29	51 34	2 33	48	48	3
34	44 39	2 7	45 39	2 11	46 38	2 15	47 38	2 19	48 38	2 23	49 37	2 26	50 37	2 30	51 37	2 34	49	49	3
36	44 42	2 8	45 41	2 12	46 41	2 16	47 41	2 20	48 40	2 24	49 40	2 28	50 40	2 31	51 40	2 35	50	50	3
38	44 44	2 9	45 44	2 13	46 44	2 17	47 43	2 21	48 43	2 25	49 43	2 29	50 43	2 33	51 42	2 37	51	51	3
40	44 47	2 10	45 47	2 14	46 46	2 18	47 46	2 22	48 45	2 26	49 45	2 30	50 45	2 34	51 45	2 38	52	52	3
42	44 49	2 12	45 49	2 15	46 49	2 19	47 48	2 23	48 48	2 27	49 48	2 31	50 48	2 35	51 47	2 39	53	53	3
44	44 52	2 13	45 51	2 17	46 51	2 21	47 51	2 24	48 51	2 28	49 50	2 32	50 50	2 36	51 50	2 40	54	54	3
46	44 54	2 14	45 54	2 18	46 54	2 22	47 53	2 26	48 53	2 30	49 53	2 34	50 52	2 37	51 52	2 42	55	55	3
48	44 57	2 15	45 56	2 19	46 56	2 23	47 56	2 27	48 55	2 31	49 55	2 35	50 55	2 39	51 55	2 43	56	56	3
50	44 59	2 16	45 59	2 20	46 58	2 24	47 58	2 28	48 58	2 32	49 57	2 36	50 57	2 40	51 57	2 44	57	57	3
52	45 1	2 17	46 1	2 21	47 1	2 25	48 0	2 29	49 0	2 33	50 0	2 37	51 0	2 41	51 59	2 45	58	58	3
54	45 4	2 18	46 3	2 22	47 3	2 26	48 3	2 30	49 3	2 34	50 2	2 38	51 2	2 42	52 2	2 46	59	59	3
56	45 6	2 19	46 6	2 23	47 6	2 27	48 5	2 31	49 5	2 35	50 5	2 39	51 4	2 43	52 4	2 48	60	60	3
58	45 9	2 20	46 8	2 24	47 8	2 28	48 8	2 32	49 7	2 37	50 7	2 41	51 7	2 45	52 7	2 49			

Alt.	☉	A	☽	A
°	′	°	′	°
0	8	8	6	6
5	7	3	5	4
10	6	3	4	2
15	5	2	3	2
20	4	2	3	1
25	4	1	2	1
30	3	1	2	1
35	3	1	2	0
40	2	1	1	1
45	2	1	1	0
50	2	0	1	0
55	1	0	1	0
60	1	0	1	0
65	1	0	0	0
70	1	0	0	0
75	0	0	0	0
80	0	0	0	0
85	0	0	0	0
90	0	0	0	0

(6° and 7°) Correction of the Moon's Altitude, and the Aux. Angle A.

App. Alt.	Minutes of Moon's Hor. Parallax. 54′		55′		56′		57′		58′		59′		60′		61′	
6°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
0′	45 11	2 21	46 11	2 25	47 10	2 30	48 10	2 34	49 10	2 38	50 10	2 42	51 9	2 46	52 9	2 50
2	45 13	2 22	46 13	2 26	47 12	2 31	48 12	2 35	49 12	2 39	50 12	2 43	51 11	2 47	52 11	2 51
4	45 15	2 23	46 15	2 28	47 15	2 32	48 14	2 36	49 14	2 40	50 14	2 44	51 13	2 48	52 13	2 52
6	45 17	2 25	46 17	2 29	47 17	2 33	48 16	2 37	49 16	2 41	50 16	2 45	51 15	2 49	52 15	2 54
8	45 19	2 26	46 19	2 30	47 19	2 34	48 18	2 38	49 18	2 42	50 18	2 46	51 17	2 51	52 17	2 55
10	45 21	2 27	46 21	2 31	47 21	2 35	48 20	2 39	49 20	2 43	50 20	2 48	51 20	2 52	52 19	2 56
12	45 24	2 28	46 23	2 32	47 23	2 36	48 23	2 40	49 22	2 45	50 22	2 49	51 22	2 53	52 21	2 57
14	45 25	2 29	46 25	2 33	47 25	2 37	48 25	2 42	49 24	2 46	50 24	2 50	51 24	2 54	52 23	2 59
16	45 28	2 30	46 27	2 34	47 27	2 38	48 27	2 43	49 26	2 47	50 26	2 51	51 26	2 55	52 25	3 0
18	45 30	2 31	46 30	2 35	47 29	2 39	48 29	2 44	49 29	2 48	50 28	2 52	51 28	2 57	52 27	3 1
20	45 32	2 32	46 32	2 36	47 31	2 41	48 31	2 45	49 31	2 49	50 30	2 53	51 30	2 58	52 30	3 2
22	45 34	2 33	46 34	2 37	47 33	2 42	48 33	2 46	49 33	2 50	50 32	2 55	51 32	2 59	52 32	3 3
24	45 36	2 34	46 36	2 38	47 35	2 43	48 35	2 47	49 35	2 52	50 34	2 56	51 34	3 0	52 34	3 5
26	45 38	2 35	46 38	2 40	47 37	2 44	48 37	2 48	49 37	2 53	50 36	2 57	51 36	3 1	52 36	3 6
28	45 40	2 36	46 40	2 41	47 39	2 45	48 39	2 49	49 39	2 54	50 38	2 58	51 38	3 3	52 37	3 7
30	45 42	2 37	46 42	2 42	47 41	2 46	48 41	2 51	49 40	2 55	50 40	2 59	51 40	3 4	52 39	3 8
32	45 44	2 38	46 44	2 43	47 43	2 47	48 43	2 52	49 42	2 56	50 42	3 1	51 42	3 5	52 41	3 10
34	45 46	2 40	46 46	2 44	47 45	2 48	48 45	2 53	49 44	2 57	50 44	3 2	51 44	3 6	52 43	3 11
36	45 48	2 41	46 48	2 45	47 47	2 50	48 47	2 54	49 46	2 58	50 46	3 3	51 46	3 7	52 45	3 12
38	45 50	2 42	46 50	2 46	47 49	2 51	48 49	2 55	49 48	3 0	50 48	3 4	51 48	3 9	52 47	3 13
40	45 52	2 43	46 52	2 47	47 51	2 52	48 51	2 56	49 50	3 1	50 50	3 5	51 50	3 10	52 49	3 14
42	45 54	2 44	46 53	2 48	47 53	2 53	48 53	2 57	49 52	3 2	50 52	3 6	51 51	3 11	52 51	3 16
44	45 56	2 45	46 55	2 49	47 55	2 54	48 54	2 58	49 54	3 3	50 54	3 8	51 53	3 12	52 53	3 17
46	45 57	2 46	46 57	2 50	47 57	2 55	48 56	3 0	49 56	3 4	50 55	3 9	51 55	3 13	52 55	3 18
48	45 59	2 47	46 59	2 51	47 58	2 56	48 58	3 1	49 57	3 5	50 57	3 10	51 57	3 15	52 56	3 19
50	46 1	2 48	47 0	2 52	48 0	2 57	49 0	3 2	49 59	3 6	50 59	3 11	51 58	3 16	52 58	3 20
52	46 3	2 49	47 2	2 53	48 2	2 58	49 1	3 3	50 1	3 8	51 1	3 12	52 0	3 17	53 0	3 22
54	46 4	2 50	47 4	2 54	48 4	2 59	49 3	3 4	50 3	3 9	51 2	3 13	52 2	3 18	53 2	3 23
56	46 6	2 51	47 6	2 55	48 5	3 0	49 5	3 5	50 5	3 10	51 4	3 15	52 4	3 19	53 3	3 24
58	46 8	2 52	47 8	2 56	48 7	3 1	49 7	3 6	50 6	3 11	51 6	3 16	52 5	3 21	53 5	3 25
7°	54′		55′		56′		57′		58′		59′		60′		61′	
0′	46 10	2 53	47 9	2 57	48 9	3 2	49 8	3 7	50 8	3 12	51 8	3 17	52 7	3 22	53 7	3 27
2	46 11	2 54	47 11	2 59	48 11	3 3	49 10	3 8	50 10	3 13	51 9	3 18	52 9	3 23	53 8	3 28
4	46 13	2 55	47 13	3 0	48 12	3 5	49 12	3 10	50 11	3 14	51 11	3 19	52 10	3 24	53 10	3 29
6	46 15	2 56	47 14	3 1	48 14	3 6	49 13	3 11	50 13	3 16	51 12	3 20	52 12	3 25	53 12	3 30
8	46 16	2 57	47 16	3 2	48 16	3 7	49 15	3 12	50 15	3 17	51 14	3 22	52 14	3 27	53 13	3 31
10	46 18	2 58	47 18	3 3	48 17	3 8	49 17	3 13	50 16	3 18	51 16	3 23	52 15	3 28	53 15	3 33
12	46 20	3 0	47 19	3 5	48 19	3 9	49 18	3 14	50 18	3 19	51 17	3 24	52 17	3 29	53 17	3 34
14	46 21	3 1	47 21	3 6	48 20	3 11	49 20	3 16	50 20	3 20	51 19	3 25	52 19	3 30	53 18	3 35
16	46 23	3 2	47 23	3 7	48 22	3 12	49 22	3 17	50 21	3 22	51 21	3 26	52 20	3 31	53 20	3 36
18	46 25	3 3	47 24	3 8	48 24	3 13	49 23	3 18	50 23	3 23	51 22	3 28	52 22	3 33	53 21	3 38
20	46 26	3 4	47 26	3 9	48 25	3 14	49 25	3 19	50 24	3 24	51 23	3 29	52 23	3 34	53 23	3 39
22	46 28	3 5	47 27	3 10	48 27	3 15	49 26	3 20	50 26	3 25	51 25	3 30	52 25	3 35	53 24	3 40
24	46 29	3 7	47 29	3 11	48 28	3 16	49 28	3 21	50 27	3 26	51 27	3 31	52 26	3 36	53 26	3 41
26	46 31	3 8	47 30	3 13	48 30	3 18	49 29	3 23	50 29	3 27	51 28	3 32	52 28	3 37	53 27	3 42
28	46 32	3 9	47 32	3 14	48 31	3 19	49 31	3 24	50 30	3 29	51 30	3 34	52 29	3 39	53 29	3 44
30	46 34	3 10	47 33	3 15	48 33	3 20	49 32	3 25	50 32	3 30	51 31	3 35	52 31	3 40	53 30	3 45
32	46 35	3 11	47 35	3 16	48 34	3 21	49 34	3 26	50 33	3 31	51 33	3 36	52 32	3 41	53 32	3 46
34	46 37	3 12	47 36	3 17	48 36	3 22	49 35	3 27	50 35	3 32	51 34	3 37	52 34	3 42	53 33	3 47
36	46 38	3 13	47 38	3 18	48 37	3 23	49 36	3 28	50 36	3 33	51 35	3 38	52 35	3 43	53 34	3 49
38	46 40	3 14	47 39	3 19	48 38	3 24	49 38	3 29	50 37	3 34	51 37	3 40	52 37	3 45	53 36	3 50
40	46 41	3 15	47 40	3 20	48 40	3 25	49 39	3 30	50 39	3 36	51 38	3 41	52 38	3 46	53 37	3 51
42	46 42	3 16	47 42	3 21	48 41	3 27	49 41	3 32	50 40	3 37	51 40	3 42	52 39	3 47	53 39	3 52
44	46 43	3 17	47 43	3 22	48 43	3 28	49 42	3 33	50 42	3 38	51 41	3 43	52 41	3 48	53 40	3 53
46	46 44	3 18	47 44	3 24	48 44	3 29	49 43	3 34	50 43	3 39	51 42	3 44	52 42	3 49	53 41	3 55
48	46 46	3 19	47 46	3 25	48 45	3 30	49 45	3 35	50 44	3 40	51 44	3 45	52 43	3 51	53 43	3 56
50	46 47	3 21	47 47	3 26	48 47	3 31	49 46	3 36	50 45	3 41	51 45	3 47	52 45	3 52	53 44	3 57
52	46 48	3 22	47 48	3 27	48 48	3 32	49 47	3 37	50 47	3 42	51 46	3 48	52 46	3 53	53 45	3 58
54	46 49	3 23	47 50	3 28	48 49	3 33	49 49	3 38	50 48	3 44	51 48	3 49	52 47	3 54	53 46	3 59
56	46 50	3 24	47 51	3 29	48 51	3 34	49 50	3 40	50 49	3 45	51 49	3 50	52 48	3 55	53 48	4 1
58	46 51	3 25	47 52	3 30	48 52	3 35	49 51	3 41	50 51	3 46	51 50	3 51	52 50	3 57	53 49	4 2

Seconds of H. P.		
″	Corr.	A
	″	″
1	1	0
2	2	0
3	3	0
4	4	0
5	5	0
6	6	0
7	7	1
8	8	1
9	9	1
10	10	1
11	11	1
12	12	1
13	13	1
14	14	1
15	15	1
16	16	1
17	17	1
18	18	1
19	19	2
20	20	2
21	21	2
22	22	2
23	23	2
24	24	2
25	25	2
26	26	2
27	27	2
28	28	2
29	29	2
30	30	3
31	31	3
32	32	3
33	33	3
34	34	3
35	35	3
36	36	3
37	37	3
38	38	3
39	39	3
40	40	3
41	41	3
42	42	3
43	43	4
44	44	4
45	45	4
46	46	4
47	47	4
48	48	4
49	49	4
50	50	4
51	51	4
52	52	4
53	53	4
54	54	4
55	55	5
56	56	5
57	57	5
58	58	5
59	59	5
Alt.	☰ A ☉	☰ A ☽
3	8	8
4	6	5
5	4	4
6	3	3
7	3	2
8	2	2
9	2	1
10	2	1
20	2	0
30	3	0
40	3	0
50	4	0
60	4	0
70	5	0
90	5	0

Correction of the Moon's Altitude, and the Aux. Angle A. (8° and 9°)

App Alt.	Minutes of Moon's Hor. Parallax. 54′		55′		56′		57′		58′		59		60′		61′		Seconds of H. P.		
8°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	″	Corr. ″	A ″
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	1	1	0
0′	46 54	3 26	47 54	3 31	48 53	3 36	49 53	3 42	50 52	3 47	51 51	3 52	52 51	3 58	53 50	4 3	2	2	0
2	46 55	3 27	47 55	3 32	48 54	3 38	49 54	3 43	50 53	3 48	51 53	3 54	52 52	3 59	53 51	4 4	3	3	0
4	46 57	3 28	47 56	3 33	48 55	3 39	49 55	3 44	50 54	3 49	51 54	3 55	52 53	4 0	53 53	4 6	4	4	0
6	46 58	3 29	47 57	3 34	48 57	3 40	49 56	3 45	50 55	3 51	51 55	3 56	52 54	4 1	53 54	4 7	5	5	1
8	46 59	3 30	47 58	3 36	48 58	3 41	49 57	3 46	50 56	3 52	51 56	3 57	52 55	4 2	53 55	4 8	6	6	1
10	47 0	3 31	47 59	3 37	48 59	3 42	49 58	3 47	50 57	3 53	51 57	3 58	52 56	4 4	53 56	4 9	7	7	1
12	47 1	3 32	48 0	3 38	49 0	3 43	49 59	3 49	50 58	3 54	51 58	3 59	52 58	4 5	53 57	4 10	8	8	1
14	47 2	3 33	48 2	3 39	49 1	3 44	50 0	3 50	50 59	3 55	51 59	4 1	52 59	4 6	53 58	4 12	9	9	1
16	47 3	3 34	48 3	3 40	49 2	3 45	50 2	3 51	51 0	3 56	52 0	4 2	53 0	4 7	53 59	4 13	10	10	1
18	47 4	3 36	48 4	3 41	49 3	3 47	50 3	3 52	51 1	3 57	52 1	4 3	53 1	4 8	54 0	4 14	11	11	1
20	47 6	3 37	48 5	3 42	49 4	3 48	50 4	3 53	51 3	3 59	52 3	4 4	53 2	4 10	54 1	4 15	12	12	1
22	47 7	3 38	48 6	3 43	49 6	3 49	50 5	3 54	51 4	4 0	52 4	4 5	53 3	4 11	54 2	4 17	13	13	1
24	47 8	3 39	48 7	3 44	49 7	3 50	50 6	3 55	51 5	4 1	52 5	4 6	53 4	4 12	54 4	4 18	14	14	1
26	47 9	3 40	48 8	3 45	49 8	3 51	50 7	3 57	51 6	4 2	52 6	4 8	53 5	4 13	54 5	4 19	15	15	2
28	47 10	3 41	48 9	3 47	49 9	3 52	50 8	3 58	51 8	4 3	52 7	4 9	53 6	4 14	54 6	4 20	16	16	2
30	47 11	3 42	48 11	3 48	49 10	3 53	50 9	3 59	51 9	4 4	52 8	4 10	53 7	4 16	54 7	4 21	17	17	2
32	47 12	3 43	48 12	3 49	49 11	3 54	50 10	4 0	51 10	4 6	52 9	4 11	53 8	4 17	54 8	4 23	18	18	2
34	47 14	3 44	48 13	3 50	49 12	3 55	50 11	4 1	51 11	4 7	52 10	4 12	53 9	4 18	54 9	4 24	19	19	2
36	47 15	3 45	48 14	3 51	49 13	3 57	50 12	4 2	51 12	4 8	52 11	4 14	53 11	4 19	54 10	4 25	20	20	2
38	47 16	3 46	48 15	3 52	49 14	3 58	50 14	4 3	51 13	4 9	52 12	4 15	53 12	4 20	54 11	4 26	21	21	3
40	47 17	3 47	48 16	3 53	49 15	3 59	50 15	4 4	51 14	4 10	52 13	4 16	53 13	4 22	54 12	4 27	22	22	3
42	47 18	3 48	48 17	3 54	49 17	4 0	50 16	4 6	51 15	4 11	52 14	4 17	53 14	4 23	54 13	4 29	23	23	3
44	47 19	3 50	48 18	3 55	49 18	4 1	50 17	4 7	51 16	4 13	52 15	4 18	53 15	4 24	54 14	4 30	24	24	3
46	47 20	3 51	48 19	3 56	49 19	4 2	50 18	4 8	51 17	4 14	52 16	4 19	53 16	4 25	54 15	4 31	25	25	3
48	47 21	3 52	48 20	3 57	49 20	4 3	50 19	4 9	51 18	4 15	52 17	4 21	53 17	4 26	54 16	4 32	26	26	3
50	47 22	3 53	48 21	3 59	49 21	4 4	50 20	4 10	51 19	4 16	52 18	4 22	53 18	4 28	54 17	4 33	27	27	3
52	47 23	3 54	48 22	4 0	49 22	4 5	50 21	4 11	51 20	4 17	52 19	4 23	53 19	4 29	54 18	4 35	28	28	3
54	47 24	3 55	48 23	4 1	49 23	4 7	50 22	4 12	51 21	4 18	52 20	4 24	53 20	4 30	54 19	4 36	29	29	3
56	47 25	3 56	48 24	4 2	49 24	4 8	50 23	4 14	51 22	4 19	52 21	4 25	53 21	4 31	54 20	4 37	30	30	3
58	47 26	3 57	48 25	4 3	49 25	4 9	50 24	4 15	51 23	4 21	52 22	4 27	53 22	4 32	54 21	4 38	31	31	3
9°	54′		55′		56′		57′		58′		59′		60′		61′		32	32	3
0′	47 27	3 58	48 26	4 4	49 26	4 10	50 25	4 16	51 24	4 22	52 23	4 28	53 23	4 34	54 22	4 40	33	33	3
2	47 28	3 59	48 27	4 5	49 27	4 11	50 26	4 17	51 25	4 23	52 24	4 29	53 24	4 35	54 23	4 41	34	34	4
4	47 29	4 0	48 28	4 6	49 28	4 12	50 27	4 18	51 26	4 24	52 25	4 30	53 25	4 36	54 24	4 42	35	35	4
6	47 30	4 1	48 29	4 7	49 29	4 13	50 28	4 19	51 27	4 25	52 26	4 31	53 26	4 37	54 25	4 43	36	36	4
8	47 31	4 2	48 30	4 8	49 30	4 14	50 29	4 20	51 28	4 26	52 27	4 32	53 27	4 38	54 26	4 44	37	37	4
10	47 32	4 4	48 31	4 10	49 30	4 16	50 30	4 22	51 29	4 28	52 28	4 34	53 27	4 40	54 27	4 46	38	38	4
12	47 33	4 5	48 32	4 11	49 31	4 17	50 31	4 23	51 30	4 29	52 29	4 35	53 28	4 41	54 28	4 47	39	39	5
14	47 34	4 6	48 33	4 12	49 32	4 18	50 32	4 24	51 31	4 30	52 30	4 36	53 29	4 42	54 29	4 48	40	40	5
16	47 35	4 7	48 34	4 13	49 33	4 19	50 33	4 25	51 32	4 31	52 31	4 37	53 30	4 43	54 30	4 49	41	41	5
18	47 36	4 8	48 35	4 14	49 34	4 20	50 34	4 26	51 33	4 32	52 32	4 38	53 31	4 44	54 31	4 51	42	42	5
20	47 37	4 9	48 36	4 15	49 35	4 21	50 35	4 27	51 34	4 34	52 33	4 39	53 32	4 46	54 32	4 52	43	43	5
22	47 38	4 10	48 37	4 16	49 36	4 22	50 35	4 28	51 35	4 35	52 34	4 41	53 33	4 47	54 32	4 53	44	44	5
24	47 39	4 11	48 38	4 17	49 37	4 23	50 36	4 30	51 35	4 36	52 35	4 42	53 34	4 48	54 33	4 54	45	45	6
26	47 39	4 12	48 39	4 18	49 38	4 25	50 37	4 31	51 36	4 37	52 35	4 43	53 35	4 49	54 34	4 55	46	46	6
28	47 40	4 13	48 39	4 19	49 39	4 26	50 38	4 32	51 37	4 38	52 36	4 44	53 35	4 50	54 35	4 57	47	47	6
30	47 41	4 14	48 40	4 21	49 39	4 27	50 39	4 33	51 38	4 39	52 37	4 45	53 36	4 52	54 35	4 58	48	48	6
32	47 42	4 15	48 41	4 22	49 40	4 28	50 39	4 34	51 38	4 40	52 38	4 47	53 37	4 53	54 36	4 59	49	49	6
34	47 43	4 16	48 42	4 23	49 41	4 29	50 40	4 35	51 39	4 41	52 38	4 48	53 38	4 54	54 37	5 0	50	50	7
36	47 43	4 18	48 43	4 24	49 42	4 30	50 41	4 36	51 40	4 43	52 39	4 49	53 38	4 55	54 38	5 1	51	51	7
38	47 44	4 19	48 43	4 25	49 42	4 31	50 42	4 37	51 41	4 44	52 40	4 50	53 39	4 56	54 38	5 3	52	52	7
40	47 45	4 20	48 44	4 26	49 43	4 32	50 42	4 39	51 41	4 45	52 41	4 51	53 40	4 57	54 39	5 4	53	53	7
42	47 46	4 21	48 45	4 27	49 44	4 33	50 43	4 40	51 42	4 46	52 41	4 52	53 40	4 59	54 40	5 5	54	54	8
44	47 46	4 22	48 45	4 28	49 45	4 35	50 44	4 41	51 43	4 47	52 42	4 54	53 41	5 0	54 40	5 6	55	55	8
46	47 47	4 23	48 46	4 29	49 45	4 36	50 44	4 42	51 43	4 48	52 43	4 55	53 42	5 1	54 41	5 8	56	56	8
48	47 48	4 24	48 47	4 30	49 46	4 37	50 45	4 43	51 44	4 49	52 43	4 56	53 42	5 2	54 42	5 9	57	57	9
50	47 48	4 25	48 47	4 31	49 46	4 38	50 46	4 44	51 45	4 51	52 44	4 57	53 43	5 3	54 42	5 10	58	58	9
52	47 49	4 26	48 48	4 33	49 47	4 39	50 46	4 45	51 45	4 52	52 45	4 58	53 44	5 5	54 43	5 11	59	59	9
54	47 50	4 27	48 49	4 34	49 48	4 40	50 47	4 47	51 46	4 53	52 45	4 59	53 44	5 6	54 43	5 12	60	60	9
56	47 50	4 28	48 49	4 35	49 49	4 41	50 48	4 48	51 47	4 54	52 46	5 1	53 45	5 7	54 44	5 14	70	70	10
58	47 51	4 29	48 50	4 36	49 49	4 42	50 48	4 49	51 47	4 55	52 47	5 2	53 46	5 8	54 45	5 15	80	80	11
																	90	90	12

Alt.	☉	A
°	′	″
3	8	8
4	6	6
5	4	4
6	3	3
7	3	2
8	2	2
9	2	1
10	2	1
20	2	0
30	2	0
40	1	0
50	1	0
60	1	0
70	1	0
80	1	0
90	1	0

(10° and 11°) Correction of the Moon's Altitude, and the Aux. Angle A.

App. Alt.	Minutes of Moon's Hor. Parallax. 54′		55′		56′		57′		58′		59′		60		61′		Seconds of H. P.		
	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°		Corr.	A
10°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	″	′ ″	′ ″	′ ″	′ ″	″	″	″
0′	47 52	4 30	48 51	4 37	49 50	4 43	50 49	4 50	51 48	4 56	52 47	5 3	53 46	5 9	54 45	5 16	1	1	0
2	47 52	4 31	48 51	4 38	49 51	4 45	50 50	4 51	51 49	4 58	52 48	5 4	53 47	5 11	54 46	5 17	2	2	0
4	47 53	4 33	48 52	4 39	49 51	4 46	50 50	4 52	51 49	4 59	52 48	5 5	53 48	5 12	54 47	5 18	3	3	0
6	47 54	4 34	48 53	4 40	49 52	4 47	50 51	4 53	51 50	5 0	52 49	5 6	53 48	5 13	54 47	5 20	4	4	0
8	47 54	4 35	48 53	4 41	49 52	4 48	50 52	4 54	51 51	5 1	52 50	5 8	53 49	5 14	54 48	5 21	5	5	1
10	47 55	4 36	48 54	4 42	49 53	4 49	50 52	4 55	51 51	5 2	52 50	5 9	53 49	5 15	54 49	5 22	6	6	1
12	47 56	4 37	48 55	4 43	49 54	4 50	50 53	4 57	51 52	5 3	52 51	5 10	53 50	5 16	54 49	5 23	7	7	1
14	47 56	4 38	48 55	4 44	49 54	4 51	50 54	4 58	51 53	5 4	52 52	5 11	53 51	5 18	54 50	5 24	8	8	1
16	47 57	4 39	48 56	4 46	49 55	4 52	50 54	4 59	51 53	5 6	52 52	5 12	53 51	5 19	54 50	5 26	9	9	1
18	47 58	4 40	48 57	4 47	49 56	4 53	50 55	5 0	51 54	5 7	52 53	5 13	53 52	5 20	54 51	5 27	10	10	1
20	47 58	4 41	48 57	4 48	49 56	4 54	50 55	5 1	51 54	5 8	52 54	5 14	53 53	5 21	54 52	5 28	11	11	1
22	47 59	4 42	48 58	4 49	49 57	4 56	50 56	5 2	51 55	5 9	52 54	5 16	53 53	5 22	54 52	5 29	12	12	1
24	48 0	4 43	48 59	4 50	49 58	4 57	50 57	5 3	51 56	5 10	52 55	5 17	53 54	5 24	54 53	5 31	13	13	2
26	48 0	4 44	48 59	4 51	49 58	4 58	50 57	5 5	51 56	5 11	52 55	5 18	53 54	5 25	54 54	5 32	14	14	2
28	48 1	4 45	49 0	4 52	49 59	4 59	50 58	5 6	51 57	5 12	52 56	5 19	53 55	5 26	54 54	5 33	15	15	2
30	48 2	4 46	49 1	4 53	50 0	5 0	50 59	5 7	51 58	5 14	52 57	5 20	53 56	5 27	54 55	5 34	16	16	2
32	48 2	4 47	49 1	4 54	50 0	5 1	50 59	5 8	51 58	5 15	52 57	5 22	53 56	5 28	54 55	5 35	17	17	2
34	48 3	4 49	49 2	4 55	50 1	5 2	51 0	5 9	51 59	5 16	52 58	5 23	53 57	5 30	54 56	5 37	18	18	2
36	48 4	4 50	49 3	4 56	50 2	5 3	51 1	5 10	52 0	5 17	52 59	5 24	53 58	5 31	54 57	5 38	19	19	2
38	48 4	4 51	49 3	4 58	50 2	5 4	51 1	5 11	52 0	5 18	52 59	5 25	53 58	5 32	54 57	5 39	20	20	2
40	48 5	4 52	49 4	4 59	50 3	5 6	51 2	5 12	52 1	5 19	53 0	5 26	53 59	5 33	54 58	5 40	21	20	3
42	48 5	4 53	49 4	5 0	50 3	5 7	51 2	5 14	52 1	5 21	53 0	5 27	53 59	5 34	54 58	5 41	22	21	3
44	48 6	4 54	49 5	5 1	50 4	5 8	51 3	5 15	52 2	5 22	53 1	5 29	54 0	5 36	54 59	5 43	23	22	3
46	48 7	4 55	49 6	5 2	50 4	5 9	51 3	5 16	52 2	5 23	53 1	5 30	54 0	5 37	54 59	5 44	24	23	3
48	48 7	4 56	49 6	5 3	50 5	5 10	51 4	5 17	52 3	5 24	53 2	5 31	54 1	5 38	55 0	5 45	25	24	3
50	48 8	4 57	49 7	5 4	50 6	5 11	51 4	5 18	52 3	5 25	53 2	5 32	54 1	5 39	55 0	5 46	26	25	3
52	48 8	4 58	49 7	5 5	50 6	5 12	51 5	5 19	52 4	5 26	53 3	5 33	54 2	5 40	55 1	5 47	27	26	3
54	48 9	4 59	49 8	5 6	50 7	5 13	51 6	5 20	52 5	5 27	53 3	5 34	54 2	5 42	55 1	5 49	28	27	3
56	48 9	5 0	49 8	5 7	50 7	5 14	51 6	5 22	52 5	5 29	53 4	5 36	54 3	5 43	55 2	5 50	29	28	3
58	48 10	5 1	49 9	5 9	50 8	5 16	51 7	5 23	52 6	5 30	53 4	5 37	54 3	5 44	55 2	5 51	30	29	4
																	31	30	4
																	32	31	4
																	33	32	4
																	34	33	4
																	35	34	4
																	36	35	4
																	37	36	4
																	38	37	4
																	39	38	5
																	40	39	5
11°	54′		55′		56′		57′		58′		59′		60′		61′				
0	48 10	5 2	49 9	5 10	50 8	5 17	51 7	5 24	52 6	5 31	53 5	5 38	54 4	5 45	55 3	5 52	41	40	5
2	48 11	5 4	49 10	5 11	50 9	5 18	51 8	5 25	52 7	5 32	53 5	5 39	54 4	5 46	55 3	5 53	42	41	5
4	48 11	5 5	49 10	5 12	50 9	5 19	51 8	5 26	52 7	5 33	53 6	5 40	54 5	5 47	55 4	5 55	43	42	5
																	44	43	5
6	48 12	5 6	49 11	5 13	50 9	5 20	51 8	5 27	52 7	5 34	53 6	5 41	54 5	5 49	55 4	5 56	45	44	5
8	48 12	5 7	49 11	5 14	50 10	5 21	51 9	5 28	52 8	5 35	53 7	5 43	54 5	5 50	55 4	5 57	46	45	5
10	48 13	5 8	49 11	5 15	50 10	5 22	51 9	5 29	52 8	5 37	53 7	5 44	54 6	5 51	55 5	5 58	47	46	6
																	48	47	6
12	48 13	5 9	49 12	5 16	50 11	5 23	51 10	5 31	52 8	5 38	53 7	5 45	54 6	5 52	55 5	5 59	49	48	6
14	48 13	5 10	49 12	5 17	50 11	5 24	51 10	5 32	52 9	5 39	53 8	5 46	54 7	5 53	55 6	6 1	50	49	6
16	48 14	5 11	49 13	5 18	50 12	5 25	51 10	5 33	52 9	5 40	53 8	5 47	54 7	5 55	55 6	6 2	51	50	6
18	48 14	5 12	49 13	5 19	50 12	5 27	51 11	5 34	52 10	5 41	53 9	5 48	54 7	5 56	55 6	6 3	52	51	6
20	48 15	5 13	49 13	5 20	50 12	5 28	51 11	5 35	52 10	5 42	53 9	5 50	54 8	5 57	55 7	6 4	53	52	6
22	48 15	5 14	49 14	5 21	50 13	5 29	51 12	5 36	52 10	5 43	53 9	5 51	54 8	5 58	55 7	6 5	54	53	6
																	55	54	6
24	48 16	5 15	49 14	5 23	50 13	5 30	51 12	5 37	52 11	5 45	53 10	5 52	54 9	5 59	55 7	6 7	56	55	7
26	48 16	5 16	49 15	5 24	50 14	5 31	51 12	5 38	52 11	5 46	53 10	5 53	54 9	6 0	55 8	6 8	57	56	7
28	48 16	5 17	49 15	5 25	50 14	5 32	51 13	5 39	52 12	5 47	53 10	5 54	54 9	6 2	55 8	6 9	58	57	7
																	59	58	7
30	48 17	5 18	49 16	5 26	50 14	5 33	51 13	5 41	52 12	5 48	53 11	5 55	54 10	6 3	55 8	6 10	Alt.	☽	*
32	48 17	5 19	49 16	5 27	50 15	5 34	51 14	5 42	52 12	5 49	53 11	5 57	54 10	6 4	55 9	6 11	°	A	A
34	48 18	5 20	49 16	5 28	50 15	5 35	51 14	5 43	52 13	5 50	53 12	5 58	54 10	6 5	55 9	6 13	3	8	8
36	48 18	5 21	49 17	5 29	50 16	5 36	51 14	5 44	52 13	5 51	53 12	5 59	54 11	6 6	55 10	6 14	4	6	5
38	48 19	5 22	49 17	5 30	50 16	5 38	51 15	5 45	52 14	5 53	53 12	6 0	54 11	6 8	55 10	6 15	5	4	4
40	48 19	5 23	49 18	5 31	50 16	5 39	51 15	5 46	52 14	5 54	53 13	6 1	54 11	6 9	55 10	6 16	6	3	3
42	48 19	5 25	49 18	5 32	50 17	5 40	51 15	5 47	52 14	5 55	53 13	6 2	54 12	6 10	55 11	6 18	7	3	2
44	48 20	5 26	49 18	5 33	50 17	5 41	51 16	5 48	52 15	5 56	53 13	6 4	54 12	6 11	55 11	6 19	8	2	2
46	48 20	5 27	49 19	5 34	50 17	5 42	51 16	5 49	52 15	5 57	53 14	6 5	54 12	6 12	55 11	6 20	9	2	1
																	10	2	1
48	48 20	5 28	49 19	5 35	50 18	5 43	51 16	5 51	52 15	5 58	53 14	6 6	54 13	6 13	55 11	6 21	20	2	0
50	48 20	5 29	49 19	5 36	50 18	5 44	51 17	5 52	52 15	5 59	53 14	6 7	54 13	6 15	55 12	6 22	30	3	0
52	48 21	5 30	49 19	5 38	50 18	5 45	51 17	5 53	52 16	6 1	53 14	6 8	54 13	6 16	55 12	6 23	40	3	0
																	50	4	0
54	48 21	5 31	49 20	5 39	50 18	5 46	51 17	5 54	52 16	6 2	53 15	6 9	54 13	6 17	55 12	6 25	60	4	0
56	48 21	5 32	49 20	5 40	50 19	5 47	51 17	5 55	52 16	6 3	53 15	6 10	54 14	6 18	55 12	6 26	70	5	0
58	48 22	5 33	49 20	5 41	50 19	5 49	51 18	5 56	52 16	6 4	53 15	6 12	54 14	6 19	55 13	6 27	90	5	0

Correction of the Moon's Altitude, and the Aux. Angle A. (12° and 13°)

App Alt.	Minutes of Moon's Hor. Parallax. 54′		55′		56′		57′		58′		59′		60′		61′	
12°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
0′	48 22	5 34	49 21	5 42	50 19	5 50	51 18	5 57	52 17	6 5	53 15	6 13	54 14	6 20	55 13	6 28
2	48 22	5 35	49 21	5 43	50 20	5 51	51 18	5 59	52 17	6 6	53 16	6 14	54 14	6 22	55 13	6 29
4	48 23	5 36	49 21	5 44	50 20	5 52	51 19	6 0	52 17	6 7	53 16	6 15	54 15	6 23	55 13	6 31
6	48 23	5 38	49 22	5 45	50 20	5 53	51 19	6 1	52 18	6 9	53 16	6 16	54 15	6 24	55 14	6 32
8	48 23	5 39	49 22	5 46	50 21	5 54	51 19	6 2	52 18	6 10	53 17	6 17	54 15	6 25	55 14	6 33
10	48 24	5 40	49 22	5 47	50 21	5 55	51 20	6 3	52 18	6 11	53 17	6 19	54 16	6 26	55 14	6 34
12	48 24	5 41	49 23	5 49	50 21	5 56	51 20	6 4	52 19	6 12	53 17	6 20	54 . 6	6 28	55 15	6 35
14	48 25	5 42	49 23	5 50	50 22	5 58	51 20	6 5	52 19	6 13	53 18	6 21	54 16	6 29	55 15	6 37
16	48 25	5 43	49 23	5 51	50 22	5 59	51 21	6 6	52 19	6 14	53 18	6 22	54 16	6 30	55 15	6 38
18	48 25	5 44	49 24	5 52	50 22	6 0	51 21	6 8	52 19	6 15	53 18	6 23	54 17	6 31	55 16	6 39
20	48 25	5 45	49 24	5 53	50 22	6 1	51 21	6 9	52 20	6 17	53 18	6 24	54 17	6 32	55 16	6 40
22	48 25	5 46	49 24	5 54	50 23	6 2	51 21	6 10	52 20	6 18	53 19	6 26	54 17	6 34	55 16	6 41
24	48 26	5 47	49 24	5 55	50 23	6 3	51 22	6 11	52 20	6 19	53 19	6 27	54 18	6 35	55 16	6 43
26	48 26	5 48	49 25	5 56	50 23	6 4	51 22	6 12	52 21	6 20	53 19	6 28	54 18	6 36	55 16	6 44
28	48 26	5 49	49 25	5 57	50 24	6 5	51 22	6 13	52 21	6 21	53 19	6 29	54 18	6 37	55 17	6 45
30	48 27	5 50	49 25	5 58	50 24	6 6	51 22	6 14	52 21	6 22	53 20	6 30	54 18	6 38	55 17	6 46
32	48 27	5 51	49 26	5 59	50 24	6 7	51 23	6 15	52 21	6 23	53 20	6 31	54 19	6 39	55 17	6 47
34	48 27	5 52	49 26	6 0	50 24	6 8	51 23	6 16	52 22	6 25	53 20	6 33	54 19	6 41	55 17	6 49
36	48 28	5 53	49 26	6 1	50 25	6 10	51 23	6 18	52 22	6 26	53 20	6 34	54 19	6 42	55 18	6 50
38	48 28	5 54	49 26	6 3	50 25	6 11	51 24	6 19	52 22	6 27	53 21	6 35	54 19	6 43	55 18	6 51
40	48 28	5 55	49 27	6 4	50 25	6 12	51 24	6 20	52 22	6 28	53 21	6 36	54 19	6 44	55 18	6 52
42	48 28	5 57	49 27	6 5	50 25	6 13	51 24	6 21	52 23	6 29	53 21	6 37	54 20	6 45	55 18	6 53
44	48 29	5 58	49 27	6 6	50 26	6 14	51 24	6 22	52 23	6 30	53 21	6 38	54 20	6 46	55 18	6 55
46	48 29	5 59	49 27	6 7	50 26	6 15	51 24	6 23	52 23	6 31	53 21	6 39	54 20	6 48	55 19	6 56
48	48 29	6 0	49 28	6 8	50 26	6 16	51 25	6 24	52 23	6 32	53 22	6 41	54 20	6 49	55 19	6 57
50	48 29	6 1	49 28	6 9	50 26	6 17	51 25	6 25	52 23	6 34	53 22	6 42	54 20	6 50	55 19	6 58
52	48 29	6 2	49 28	6 10	50 26	6 18	51 25	6 27	52 23	6 35	53 22	6 43	54 21	6 51	55 19	6 59
54	48 30	6 3	49 28	6 11	50 27	6 19	51 25	6 28	52 24	6 36	53 22	6 44	54 21	6 52	55 19	7 1
56	48 30	6 4	49 28	6 12	50 27	6 20	51 25	6 29	52 24	6 37	53 22	6 45	54 21	6 54	55 19	7 2
58	48 30	6 5	49 29	6 13	50 27	6 22	51 26	6 30	52 24	6 38	53 23	6 46	54 21	6 55	55 20	7 3
13°	54′		55′		56′		57′		58′		59′		60′		61′	
0′	48 30	6 6	49 29	6 14	50 27	6 23	51 26	6 31	52 24	6 39	53 23	6 48	54 21	6 56	55 20	7 4
2	48 30	6 7	49 29	6 15	50 27	6 24	51 26	6 32	52 24	6 40	53 23	6 49	54 21	6 57	55 20	7 5
4	48 31	6 8	49 29	6 17	50 28	6 25	51 26	6 33	52 24	6 42	53 23	6 50	54 21	6 58	55 20	7 7
6	48 31	6 9	49 29	6 18	50 28	6 26	51 26	6 34	52 25	6 43	53 23	6 51	54 22	6 59	55 20	7 8
8	48 31	6 10	49 29	6 19	50 28	6 27	51 26	6 35	52 25	6 44	53 23	6 52	54 22	7 0	55 20	7 9
10	48 31	6 11	49 30	6 20	50 28	6 28	51 26	6 37	52 25	6 45	53 23	6 53	54 22	7 2	55 20	7 10
12	48 31	6 12	49 30	6 21	50 28	6 29	51 27	6 38	52 25	6 46	53 24	6 55	54 22	7 3	55 20	7 11
14	48 32	6 14	49 30	6 22	50 28	6 30	51 27	6 39	52 25	6 47	53 24	6 56	54 22	7 4	55 21	7 13
16	48 32	6 15	49 30	6 23	50 29	6 31	51 27	6 40	52 25	6 48	53 24	6 57	54 22	7 5	55 21	7 14
18	48 32	6 16	49 30	6 24	50 29	6 33	51 27	6 41	52 26	6 50	53 24	6 58	54 22	7 7	55 21	7 15
20	48 32	6 17	49 30	6 25	50 29	6 34	51 27	6 42	52 26	6 51	53 24	6 59	54 23	7 8	55 21	7 16
22	48 32	6 18	49 31	6 26	50 29	6 35	51 27	6 43	52 26	6 52	53 24	7 0	54 23	7 9	55 21	7 17
24	48 32	6 19	49 31	6 27	50 29	6 36	51 28	6 44	52 26	6 53	53 24	7 1	54 23	7 10	55 21	7 19
26	48 32	6 20	49 31	6 28	50 29	6 37	51 28	6 46	52 26	6 54	53 24	7 3	54 23	7 11	55 21	7 20
28	48 33	6 21	49 31	6 29	50 29	6 38	51 28	6 47	52 26	6 55	53 25	7 4	54 23	7 12	55 21	7 21
30	48 33	6 22	49 31	6 31	50 29	6 39	51 28	6 48	52 26	6 56	53 25	7 5	54 23	7 14	55 21	7 22
32	48 33	6 23	49 31	6 32	50 30	6 40	51 28	6 49	52 26	6 57	53 25	7 6	54 23	7 15	55 22	7 23
34	48 33	6 24	49 31	6 33	50 30	6 41	51 28	6 50	52 26	6 59	53 25	7 7	54 23	7 16	55 22	7 25
36	48 33	6 25	49 31	6 34	50 30	6 42	51 28	6 51	52 27	7 0	53 25	7 8	54 23	7 17	55 22	7 26
38	48 33	6 26	49 32	6 35	50 30	6 44	51 28	6 52	52 27	7 1	53 25	7 10	54 23	7 18	55 22	7 27
40	48 33	6 27	49 32	6 36	50 30	6 45	51 28	6 53	52 27	7 2	53 25	7 11	54 23	7 19	55 22	7 28
42	48 34	6 28	49 32	6 37	50 30	6 46	51 29	6 54	52 27	7 3	53 25	7 12	54 24	7 21	55 22	7 29
44	48 34	6 29	49 32	6 38	50 30	6 47	51 29	6 56	52 27	7 4	53 25	7 13	54 24	7 22	55 22	7 30
46	48 34	6 30	49 32	6 39	50 30	6 48	51 29	6 57	52 27	7 5	53 25	7 14	54 24	7 23	55 22	7 32
48	48 34	6 31	49 32	6 40	50 31	6 49	51 29	6 58	52 27	7 7	53 25	7 15	54 24	7 24	55 22	7 33
50	48 34	6 32	49 32	6 41	50 31	6 50	51 29	6 59	52 27	7 8	53 25	7 16	54 24	7 25	55 22	7 34
52	48 34	6 34	49 32	6 42	50 31	6 51	51 29	7 0	52 27	7 9	53 26	7 18	54 24	7 26	55 22	7 35
54	48 34	6 35	49 33	6 43	50 31	6 52	51 29	7 1	52 27	7 10	53 26	7 19	54 24	7 28	55 22	7 36
56	48 34	6 36	49 33	6 45	50 31	6 53	51 29	7 2	52 27	7 11	53 26	7 20	54 24	7 29	55 22	7 3
58	48 35	6 37	49 33	6 46	50 31	6 54	51 29	7 3	52 28	7 12	53 26	7 21	54 24	7 30	55 22	7 39

Seconds of H. P.	Corr.	A
″	″	″
1	1	0
2	2	0
3	3	0
4	4	1
5	5	1
6	6	1
7	7	1
8	8	1
9	9	1
10	10	1
11	11	2
12	12	2
13	13	2
14	14	2
15	15	2
16	16	2
17	17	2
18	18	2
19	19	3
20	20	3
21	20	3
22	21	3
23	22	3
24	23	3
25	24	3
26	25	4
27	26	4
28	27	4
29	28	4
30	29	4
31	30	4
32	31	4
33	32	4
34	33	5
35	34	5
36	35	5
37	36	5
38	37	5
39	38	5
40	39	5
41	40	6
42	41	6
43	42	6
44	43	6
45	44	6
46	45	6
47	46	6
48	47	6
49	48	7
50	49	7
51	50	7
52	51	7
53	52	7
54	53	7
55	54	7
56	55	8
57	56	8
58	57	8
59	58	8
App. Alt.	☉	A
°	′	′
4	6	5
5	4	4
6	3	3
7	3	2
8	2	2
9	2	1
10	2	1
20	2	0
30	3	0
40	3	0
50	4	0
60	4	0
70	5	0
90	5	0

(14° and 15°) Correction of the Moon's Altitude, and the Aux. Angle A.

App. Alt.	Minutes of Moon's Hor. Parallax. 54′		55′		56′		57′		58′		59′		60′		61′		Seconds of H. P.		
14°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	″	Cor.	A
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′	′ ″		″	″
0′	48 35	6 38	49 33	6 47	50 31	6 56	51 29	7 4	52 28	7 13	53 26	7 22	54 24	7 31	55 22	7 40	1	1	0
2	48 35	6 39	49 33	6 48	50 31	6 57	51 29	7 6	52 28	7 14	53 26	7 23	54 24	7 32	55 22	7 41	2	2	0
4	48 35	6 40	49 33	6 49	50 31	6 58	51 30	7 7	52 28	7 16	53 26	7 24	54 24	7 33	55 22	7 42	3	3	0
6	48 35	6 41	49 33	6 50	50 31	6 59	51 30	7 8	52 28	7 17	53 26	7 26	54 24	7 35	55 22	7 44	4	4	1
8	48 35	6 42	49 33	6 51	50 32	7 0	51 30	7 9	52 28	7 18	53 26	7 27	54 24	7 36	55 22	7 45	5	5	1
10	48 35	6 43	49 33	6 52	50 32	7 1	51 30	7 10	52 28	7 19	53 26	7 28	54 24	7 37	55 22	7 46	6	6	1
12	48 35	6 44	49 33	6 53	50 32	7 2	51 30	7 11	52 28	7 20	53 26	7 29	54 24	7 38	55 22	7 47	7	7	1
14	48 35	6 45	49 34	6 54	50 32	7 3	51 30	7 12	52 28	7 21	53 26	7 30	54 24	7 39	55 22	7 48	8	8	1
16	48 35	6 46	49 34	6 55	50 32	7 4	51 30	7 13	52 28	7 22	53 26	7 31	54 24	7 40	55 22	7 49	9	9	1
18	48 35	6 47	49 34	6 56	50 32	7 5	51 30	7 14	52 28	7 23	53 26	7 33	54 24	7 42	55 23	7 51	10	10	2
20	48 36	6 48	49 34	6 57	50 32	7 6	51 30	7 15	52 28	7 25	53 26	7 34	54 24	7 43	55 23	7 52	11	11	2
22	48 36	6 49	49 34	6 58	50 32	7 7	51 30	7 17	52 28	7 26	53 26	7 35	54 24	7 44	55 23	7 53	12	12	2
24	48 36	6 50	49 34	7 0	50 32	7 9	51 30	7 18	52 28	7 27	53 26	7 36	54 24	7 45	55 23	7 54	13	13	2
26	48 36	6 51	49 34	7 1	50 32	7 10	51 30	7 19	52 28	7 28	53 26	7 37	54 24	7 46	55 23	7 55	14	14	2
28	48 36	6 53	49 34	7 2	50 32	7 11	51 30	7 20	52 28	7 29	53 26	7 38	54 24	7 47	55 23	7 57	15	14	2
30	48 36	6 54	49 34	7 3	50 32	7 12	51 30	7 21	52 28	7 30	53 26	7 39	54 24	7 49	55 23	7 58	16	15	2
32	48 36	6 55	49 34	7 4	50 32	7 13	51 30	7 22	52 28	7 31	53 26	7 41	54 24	7 50	55 23	7 59	17	16	3
34	48 36	6 56	49 34	7 5	50 32	7 14	51 30	7 23	52 28	7 33	53 26	7 42	54 24	7 51	55 23	8 0	18	17	3
36	48 36	6 57	49 34	7 6	50 32	7 15	51 30	7 24	52 28	7 34	53 26	7 43	54 24	7 52	55 23	8 1	19	18	3
38	48 36	6 58	49 34	7 7	50 32	7 16	51 30	7 26	52 28	7 35	53 26	7 44	54 24	7 53	55 22	8 3	20	19	3
40	48 36	6 59	49 34	7 8	50 32	7 17	51 30	7 27	52 28	7 36	53 26	7 45	54 24	7 54	55 22	8 4	21	20	3
42	48 36	7 0	49 34	7 9	50 32	7 18	51 30	7 28	52 28	7 37	53 26	7 46	54 24	7 56	55 22	8 5	22	21	3
44	48 36	7 1	49 34	7 10	50 32	7 20	51 30	7 29	52 28	7 38	53 26	7 48	54 24	7 57	55 22	8 6	23	22	4
46	48 36	7 2	49 34	7 11	50 32	7 21	51 30	7 30	52 28	7 39	53 26	7 49	54 24	7 58	55 22	8 7	24	23	4
48	48 36	7 3	49 34	7 12	50 32	7 22	51 30	7 31	52 28	7 40	53 26	7 50	54 24	7 59	55 22	8 9	25	24	4
50	48 36	7 4	49 34	7 14	50 32	7 23	51 30	7 32	52 28	7 42	53 26	7 51	54 24	8 0	55 22	8 10	26	25	4
52	48 36	7 5	49 34	7 15	50 32	7 24	51 30	7 33	52 28	7 43	53 26	7 52	54 24	8 1	55 22	8 11	27	26	4
54	48 36	7 6	49 34	7 16	50 32	7 25	51 30	7 34	52 28	7 44	53 26	7 53	54 24	8 3	55 22	8 12	28	27	4
56	48 36	7 7	49 34	7 17	50 32	7 26	51 30	7 36	52 28	7 45	53 26	7 54	54 24	8 4	55 22	8 13	29	28	4
58	48 36	7 8	49 34	7 18	50 32	7 27	51 30	7 37	52 28	7 46	53 26	7 56	54 24	8 5	55 22	8 14	30	29	5
																	31	30	5
15°	54′		55′		56′		57′		58′		59′		60′		61′		32	31	5
0′	48 36	7 9	49 34	7 19	50 32	7 28	51 30	7 38	52 28	7 47	53 26	7 57	54 24	8 6	55 22	8 16	33	32	5
2	48 36	7 10	49 34	7 20	50 32	7 29	51 30	7 39	52 28	7 48	53 26	7 58	54 24	8 7	55 22	8 17	34	33	5
4	48 36	7 11	49 34	7 21	50 32	7 30	51 30	7 40	52 28	7 49	53 26	7 59	54 24	8 8	55 22	8 18	35	34	5
6	48 36	7 13	49 34	7 22	50 32	7 32	51 30	7 41	52 28	7 51	53 26	8 0	54 24	8 10	55 22	8 19	36	35	5
8	48 36	7 14	49 34	7 23	50 32	7 33	51 30	7 42	52 28	7 52	53 26	8 1	54 24	8 11	55 22	8 20	37	36	6
10	48 36	7 15	49 34	7 24	50 32	7 34	51 30	7 43	52 28	7 53	53 26	8 2	54 24	8 12	55 22	8 21	38	37	6
12	48 36	7 16	49 34	7 25	50 32	7 35	51 30	7 44	52 28	7 54	53 26	8 4	54 23	8 13	55 22	8 23	39	38	6
14	48 36	7 17	49 34	7 26	50 32	7 36	51 30	7 45	52 28	7 55	53 26	8 5	54 23	8 14	55 21	8 24	40	39	6
16	48 36	7 18	49 34	7 27	50 32	7 37	51 30	7 47	52 28	7 56	53 25	8 6	54 23	8 15	55 21	8 25	41	40	6
18	48 36	7 19	49 34	7 28	50 32	7 38	51 30	7 48	52 27	7 57	53 25	8 7	54 23	8 17	55 21	8 26	42	41	6
20	48 36	7 20	49 34	7 29	50 32	7 39	51 30	7 49	52 27	7 58	53 25	8 8	54 23	8 18	55 21	8 27	43	42	7
22	48 36	7 21	49 34	7 31	50 32	7 40	51 30	7 50	52 27	8 0	53 25	8 9	54 23	8 19	55 21	8 29	44	42	7
24	48 36	7 22	49 34	7 32	50 32	7 41	51 30	7 51	52 27	8 1	53 25	8 10	54 23	8 20	55 21	8 30	45	43	7
26	48 36	7 23	49 34	7 33	50 32	7 42	51 29	7 52	52 27	8 2	53 25	8 11	54 23	8 21	55 21	8 31	46	44	7
28	48 36	7 24	49 34	7 34	50 31	7 43	51 29	7 53	52 27	8 3	53 25	8 13	54 23	8 22	55 21	8 32	47	45	7
30	48 36	7 25	49 33	7 35	50 31	7 44	51 29	7 54	52 27	8 4	53 25	8 14	54 23	8 23	55 21	8 33	48	46	7
32	48 36	7 26	49 33	7 36	50 31	7 46	51 29	7 55	52 27	8 5	53 25	8 15	54 23	8 25	55 20	8 34	49	47	7
34	48 36	7 27	49 33	7 37	50 31	7 47	51 29	7 56	52 27	8 6	53 25	8 16	54 22	8 26	55 20	8 36	50	48	8
36	48 36	7 28	49 33	7 38	50 31	7 48	51 29	7 58	52 27	8 7	53 24	8 17	54 22	8 27	55 20	8 37	51	49	8
38	48 36	7 29	49 33	7 39	50 31	7 49	51 29	7 59	52 27	8 8	53 24	8 18	54 22	8 28	55 20	8 38	52	50	8
40	48 36	7 30	49 33	7 40	50 31	7 50	51 29	8 0	52 27	8 9	53 24	8 19	54 22	8 29	55 20	8 39	53	51	8
42	48 36	7 31	49 33	7 41	50 31	7 51	51 29	8 1	52 27	8 11	53 24	8 21	54 22	8 30	55 20	8 40	54	52	8
44	48 36	7 32	49 33	7 42	50 31	7 52	51 29	8 2	52 27	8 12	53 24	8 22	54 22	8 32	55 20	8 41	55	53	8
46	48 36	7 33	49 33	7 43	50 31	7 53	51 29	8 3	52 27	8 13	53 24	8 23	54 22	8 33	55 20	8 43	56	54	8
48	48 36	7 34	49 33	7 44	50 31	7 54	51 29	8 4	52 27	8 14	53 24	8 24	54 22	8 34	55 20	8 44	57	55	9
50	48 36	7 35	49 33	7 45	50 31	7 55	51 29	8 5	52 27	8 15	53 24	8 25	54 22	8 35	55 19	8 45	58	56	9
52	48 36	7 37	49 33	7 46	50 31	7 56	51 29	8 6	52 27	8 16	53 24	8 26	54 22	8 36	55 19	8 46	59	57	9
54	48 36	7 38	49 33	7 48	50 31	7 57	51 29	8 7	52 26	8 17	53 24	8 27	54 22	8 37	55 19	8 47	Alt.	☽ A	♃ A
56	48 36	7 39	49 33	7 49	50 31	7 59	51 29	8 8	52 26	8 18	53 24	8 28	54 22	8 38	55 19	8 48	70	5	0
58	48 36	7 40	49 33	7 50	50 31	8 0	51 29	8 10	52 26	8 20	53 24	8 29	54 22	8 39	55 19	8 49	90	5	0

Correction of the Moon's Altitude, and the Aux. Angle A. (16° and 17°)

App. Alt.	Minutes of Moon's Hor. Parallax. 54′		55′		56′		57′		58′		59′		60′		61′	
16°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
0′	48 36	7 41	49 33	7 51	50 31	8 1	51 28	8 11	52 26	8 21	53 23	8 31	54 21	8 41	55 19	8 50
2	48 36	7 42	49 33	7 52	50 31	8 2	51 28	8 12	52 26	8 22	53 23	8 32	54 21	8 42	55 18	8 52
4	48 35	7 43	49 33	7 53	50 30	8 3	51 28	8 13	52 26	8 23	53 23	8 33	54 21	8 43	55 18	8 53
6	48 35	7 44	49 33	7 54	50 30	8 4	51 28	8 14	52 25	8 24	53 23	8 34	54 20	8 44	55 18	8 54
8	48 35	7 45	49 32	7 55	50 30	8 5	51 28	8 15	52 25	8 25	53 23	8 35	54 20	8 45	55 18	8 55
10	48 35	7 46	49 32	7 56	50 30	8 6	51 27	8 16	52 25	8 26	53 23	8 36	54 20	8 47	55 18	8 57
12	48 34	7 47	49 32	7 57	50 30	8 7	51 27	8 17	52 25	8 27	53 22	8 38	54 20	8 48	55 18	8 58
14	48 34	7 48	49 32	7 58	50 29	8 8	51 27	8 18	52 25	8 29	53 22	8 39	54 20	8 49	55 17	8 59
16	48 34	7 49	49 32	7 59	50 29	8 9	51 27	8 20	52 24	8 30	53 22	8 40	54 20	8 50	55 17	9 0
18	48 34	7 50	49 31	8 0	50 29	8 10	51 27	8 21	52 24	8 31	53 22	8 41	54 19	8 51	55 17	9 2
20	48 33	7 51	49 31	8 1	50 29	8 11	51 26	8 22	52 24	8 32	53 22	8 42	54 19	8 52	55 17	9 3
22	48 33	7 52	49 31	8 2	50 29	8 13	51 26	8 23	52 24	8 33	53 21	8 43	54 19	8 54	55 17	9 4
24	48 33	7 53	49 31	8 3	50 28	8 14	51 26	8 24	52 24	8 34	53 21	8 45	54 19	8 55	55 16	9 5
26	48 33	7 54	49 31	8 4	50 28	8 15	51 26	8 25	52 23	8 35	53 21	8 46	54 19	8 56	55 16	9 6
28	48 33	7 55	49 31	8 6	50 28	8 16	51 26	8 26	52 23	8 36	53 21	8 47	54 18	8 57	55 16	9 7
30	48 33	7 56	49 30	8 7	50 28	8 17	51 26	8 27	52 23	8 38	53 21	8 48	54 18	8 58	55 16	9 9
32	48 33	7 57	49 30	8 8	50 28	8 18	51 25	8 28	52 23	8 39	53 21	8 49	54 18	8 59	55 16	9 10
34	48 33	7 58	49 30	8 9	50 28	8 19	51 25	8 29	52 23	8 40	53 20	8 50	54 18	9 0	55 15	9 11
36	48 33	7 59	49 30	8 10	50 28	8 20	51 25	8 31	52 23	8 41	53 20	8 51	54 18	9 2	55 15	9 12
38	48 32	8 0	49 30	8 11	50 27	8 21	51 25	8 32	52 22	8 42	53 20	8 52	54 17	9 3	55 15	9 13
40	48 32	8 1	49 30	8 12	50 27	8 22	51 25	8 33	52 22	8 43	53 20	8 54	54 17	9 4	55 15	9 14
42	48 32	8 3	49 30	8 13	50 27	8 23	51 25	8 34	52 22	8 44	53 20	8 55	54 17	9 5	55 15	9 16
44	48 32	8 4	49 29	8 14	50 27	8 25	51 24	8 35	52 22	8 45	53 19	8 56	54 17	9 6	55 14	9 17
46	48 32	8 5	49 29	8 15	50 27	8 26	51 24	8 36	52 22	8 47	53 19	8 57	54 17	9 8	55 14	9 18
48	48 32	8 6	49 29	8 16	50 27	8 27	51 24	8 37	52 21	8 48	53 19	8 58	54 16	9 9	55 14	9 19
50	48 32	8 7	49 29	8 17	50 26	8 28	51 24	8 38	52 21	8 49	53 19	8 59	54 16	9 10	55 14	9 20
52	48 31	8 8	49 29	8 18	50 26	8 29	51 24	8 39	52 21	8 50	53 19	9 0	54 16	9 11	55 13	9 22
54	48 31	8 9	49 29	8 19	50 26	8 30	51 24	8 40	52 21	8 51	53 18	9 2	54 16	9 12	55 13	9 23
56	48 31	8 10	49 29	8 20	50 26	8 31	51 23	8 42	52 21	8 52	53 18	9 3	54 16	9 13	55 13	9 24
58	48 31	8 11	49 28	8 21	50 26	8 32	51 23	8 43	52 20	8 53	53 18	9 4	54 15	9 14	55 13	9 25
17°	54′		55′		56′		57′		58′		59′		60′		61′	
0′	48 31	8 12	49 28	8 22	50 26	8 33	51 23	8 44	52 20	8 54	53 18	9 5	54 15	9 16	55 12	9 26
2	48 31	8 13	49 28	8 24	50 25	8 34	51 23	8 45	52 20	8 56	53 17	9 6	54 15	9 17	55 12	9 27
4	48 30	8 14	49 28	8 25	50 25	8 35	51 23	8 46	52 20	8 57	53 17	9 7	54 15	9 18	55 12	9 29
6	48 30	8 15	49 28	8 26	50 25	8 36	51 22	8 47	52 20	8 58	53 17	9 8	54 14	9 19	55 12	9 30
8	48 30	8 16	49 27	8 27	50 25	8 37	51 22	8 48	52 19	8 59	53 17	9 10	54 14	9 20	55 11	9 31
10	48 30	8 17	49 27	8 28	50 25	8 38	51 22	8 49	52 19	9 0	53 17	9 11	54 14	9 21	55 11	9 32
12	48 30	8 18	49 27	8 29	50 24	8 40	51 22	8 50	52 19	9 1	53 16	9 12	54 14	9 22	55 11	9 33
14	48 29	8 19	49 27	8 30	50 24	8 41	51 21	8 51	52 19	9 2	53 16	9 13	54 13	9 24	55 11	9 34
16	48 29	8 20	49 27	8 31	50 24	8 42	51 21	8 53	52 19	9 3	53 16	9 14	54 13	9 25	55 10	9 36
18	48 29	8 21	49 26	8 32	50 24	8 43	51 21	8 54	52 18	9 4	53 16	9 15	54 13	9 26	55 10	9 37
20	48 29	8 22	49 26	8 33	50 23	8 44	51 21	8 55	52 18	9 5	53 15	9 16	54 13	9 27	55 10	9 38
22	48 29	8 23	49 26	8 34	50 23	8 45	51 21	8 56	52 18	9 7	53 15	9 17	54 12	9 28	55 10	9 39
24	48 28	8 24	49 26	8 35	50 23	8 46	51 20	8 57	52 18	9 8	53 15	9 19	54 12	9 29	55 9	9 40
26	48 28	8 25	49 26	8 36	50 23	8 47	51 20	8 58	52 17	9 9	53 15	9 20	54 12	9 31	55 9	9 41
28	48 28	8 26	49 25	8 37	50 23	8 48	51 20	8 59	52 17	9 10	53 14	9 21	54 12	9 32	55 9	9 43
30	48 28	8 27	49 25	8 38	50 22	8 49	51 20	9 0	52 17	9 11	53 14	9 22	54 11	9 33	55 9	9 44
32	48 28	8 28	49 25	8 39	50 22	8 50	51 19	9 1	52 17	9 12	53 14	9 23	54 11	9 34	55 8	9 45
34	48 27	8 30	49 25	8 40	50 22	8 51	51 19	9 2	52 16	9 13	53 14	9 24	54 11	9 35	55 8	9 46
36	48 27	8 31	49 25	8 41	50 22	8 52	51 19	9 3	52 16	9 14	53 13	9 25	54 11	9 36	55 8	9 47
38	48 27	8 32	49 24	8 43	50 22	8 54	51 19	9 5	52 16	9 15	53 13	9 26	54 10	9 37	55 8	9 48
40	48 27	8 33	49 24	8 44	50 21	8 55	51 18	9 6	52 16	9 17	53 13	9 28	54 10	9 39	55 7	9 50
42	48 27	8 34	49 24	8 45	50 21	8 56	51 18	9 7	52 15	9 18	53 13	9 29	54 10	9 40	55 7	9 51
44	48 26	8 35	49 24	8 46	50 21	8 57	51 18	9 8	52 15	9 19	53 12	9 30	54 9	9 41	55 7	9 52
46	48 26	8 36	49 23	8 47	50 21	8 58	51 18	9 9	52 15	9 20	53 12	9 31	54 9	9 42	55 6	9 53
48	48 26	8 37	49 23	8 48	50 20	8 59	51 17	9 10	52 15	9 21	53 12	9 32	54 9	9 43	55 6	9 54
50	48 26	8 38	49 23	8 49	50 20	9 0	51 17	9 11	52 14	9 22	53 11	9 33	54 9	9 44	55 6	9 55
52	48 26	8 39	49 23	8 50	50 20	9 1	51 17	9 12	52 14	9 23	53 11	9 34	54 8	9 45	55 5	9 57
54	48 25	8 40	49 22	8 51	50 20	9 2	51 17	9 13	52 14	9 24	53 11	9 35	54 8	9 47	55 5	9 58
56	48 25	8 41	49 22	8 52	50 19	9 3	51 16	9 14	52 13	9 25	53 11	9 37	54 8	9 48	55 5	9 59
58	48 25	8 42	49 22	8 53	50 19	9 4	51 16	9 15	52 13	9 26	53 10	9 38	54 7	9 49	55 4	10 0

Seconds of H. P.

″	Cor	A
	″	″
1	1	0
2	2	0
3	3	1
4	4	1
5	5	1
6	6	1
7	7	1
8	8	1
9	9	2
10	10	2
11	11	2
12	12	2
13	12	2
14	13	3
15	14	3
16	15	3
17	16	3
18	17	3
19	18	3
20	19	4
21	20	4
22	21	4
23	22	4
24	23	4
25	24	5
26	25	5
27	26	5
28	27	5
29	28	5
30	29	5
31	30	6
32	31	6
33	32	6
34	33	6
35	34	6
36	35	7
37	35	7
38	36	7
39	37	7
40	38	7
41	39	7
42	40	8
43	41	8
44	42	8
45	43	8
46	44	8
47	45	9
48	46	9
49	47	9
50	48	9
51	49	9
52	50	9
53	51	10
54	52	10
55	53	10
56	54	10
57	55	10
58	56	11
59	57	11
Add.	☉	☽
3	8	8
4	6	5
5	4	4
6	3	3
7	3	2
8	2	2
9	2	1
10	2	1
20	2	0
30	3	0
40	3	0
50	4	0
60	4	0
70	5	0
80	5	0

(18° and 19°) Correction of the Moon's Altitude, and the Aux. Angle A.

App Alt.	Minutes of Moon's Hor. Parallax. 54′		55′		56′		57′		58′		59′		60′		61′		Seconds of H. P.		
18°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°		Cor	A
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″		″	″
																	1	1	0
																	2	2	0
0′	48 25	8 43	49 22	8 54	50 19	9 5	51 16	9 16	52 13	9 28	53 10	9 39	54 7	9 50	55 4	10 1	3	3	1
2	48 24	8 44	49 22	8 55	50 19	9 6	51 16	9 18	52 13	9 29	53 10	9 40	54 7	9 51	55 4	10 2	4	4	1
4	48 24	8 45	49 21	8 56	50 18	9 7	51 15	9 19	52 12	9 30	53 9	9 41	54 6	9 52	55 3	10 4	5	5	1
																	6	6	1
6	48 24	8 46	49 21	8 57	50 18	9 8	51 15	9 20	52 12	9 31	53 9	9 42	54 6	9 53	55 3	10 5	7	7	1
8	48 24	8 47	49 21	8 58	50 18	9 10	51 15	9 21	52 12	9 32	53 9	9 43	54 6	9 55	55 3	10 6	8	8	2
10	48 23	8 48	49 20	8 59	50 17	9 11	51 14	9 22	52 11	9 33	53 8	9 44	54 5	9 56	55 3	10 7	9	9	2
																	10	9	2
12	48 23	8 49	49 20	9 0	50 17	9 12	51 14	9 23	52 11	9 34	53 8	9 46	54 5	9 57	55 2	10 8	11	10	2
14	48 23	8 50	49 20	9 1	50 17	9 13	51 14	9 24	52 11	9 35	53 8	9 47	54 5	9 58	55 2	10 9	12	11	2
16	48 23	8 51	49 20	9 2	50 17	9 14	51 14	9 25	52 11	9 36	53 8	9 48	54 5	9 59	55 2	10 10	13	12	3
																	14	13	3
18	48 22	8 52	49 19	9 4	50 16	9 15	51 13	9 26	52 10	9 38	53 7	9 49	54 4	10 0	55 1	10 12	15	14	3
20	48 22	8 53	49 19	9 5	50 16	9 16	51 13	9 27	52 10	9 39	53 7	9 50	54 4	10 1	55 1	10 13	16	15	3
22	48 22	8 54	49 19	9 6	50 16	9 17	51 13	9 28	52 10	9 40	53 7	9 51	54 4	10 3	55 1	10 14	17	16	3
																	18	17	4
24	48 22	8 55	49 19	9 7	50 15	9 18	51 12	9 29	52 9	9 41	53 6	9 52	54 3	10 4	55 0	10 15	19	18	4
26	48 21	8 56	49 18	9 8	50 15	9 19	51 12	9 31	52 9	9 42	53 6	9 53	54 3	10 5	55 0	10 16	20	19	4
28	48 21	8 57	49 18	9 9	50 15	9 20	51 12	9 32	52 9	9 43	53 6	9 55	54 3	10 6	55 0	10 17	21	20	4
																	22	21	4
30	48 21	8 58	49 18	9 10	50 15	9 21	51 12	9 33	52 8	9 44	53 5	9 56	54 2	10 7	54 59	10 19	23	22	5
32	48 20	8 59	49 17	9 11	50 14	9 22	51 11	9 34	52 8	9 45	53 5	9 57	54 2	10 8	54 59	10 20	24	23	5
34	48 20	9 0	49 17	9 12	50 14	9 23	51 11	9 35	52 8	9 46	53 5	9 58	54 2	10 9	54 58	10 21	25	24	5
																	26	25	5
36	48 20	9 1	49 17	9 13	50 14	9 24	51 11	9 36	52 7	9 47	53 4	9 59	54 1	10 11	54 58	10 22	27	26	5
38	48 20	9 2	49 17	9 14	50 13	9 26	51 10	9 37	52 7	9 49	53 4	10 0	54 1	10 12	54 58	10 23	28	27	6
40	48 19	9 3	49 16	9 15	50 13	9 27	51 10	9 38	52 7	9 50	53 4	10 1	54 0	10 13	54 57	10 24	29	28	6
																	30	28	6
42	48 19	9 5	49 16	9 16	50 13	9 28	51 10	9 39	52 6	9 51	53 3	10 2	54 0	10 14	54 57	10 26	31	29	6
44	48 19	9 6	49 16	9 17	50 13	9 29	51 9	9 40	52 6	9 52	53 3	10 4	54 0	10 15	54 57	10 27	32	30	6
46	48 19	9 7	49 15	9 18	50 12	9 30	51 9	9 41	52 6	9 53	53 3	10 5	53 59	10 16	54 56	10 28	33	31	7
																	34	32	7
48	48 18	9 8	49 15	9 19	50 12	9 31	51 9	9 43	52 6	9 54	53 2	10 6	53 59	10 17	54 56	10 29	35	33	7
50	48 18	9 9	49 15	9 20	50 12	9 32	51 8	9 44	52 5	9 55	53 2	10 7	53 59	10 19	54 56	10 30	36	34	7
52	48 18	9 10	49 15	9 21	50 11	9 33	51 8	9 45	52 5	9 56	53 2	10 8	53 58	10 20	54 55	10 31	37	35	7
																	38	36	8
54	48 18	9 11	49 14	9 22	50 11	9 34	51 8	9 46	52 5	9 57	53 1	10 9	53 58	10 21	54 55	10 33	39	37	8
56	48 17	9 12	49 14	9 23	50 11	9 35	51 7	9 47	52 4	9 58	53 1	10 10	53 58	10 22	54 55	10 34	40	38	8
58	48 17	9 13	49 14	9 25	50 10	9 36	51 7	9 48	52 4	10 0	53 1	10 11	53 57	10 23	54 54	10 35	41	39	8
																	42	40	8
19°	54′		55′		56′		57′		58′		59′		60′		61′		43	41	9
0′	48 17	9 14	49 13	9 26	50 10	9 37	51 7	9 49	52 4	10 1	53 0	10 13	53 57	10 24	54 54	10 36	44	42	9
2	48 16	9 15	49 13	9 27	50 10	9 38	51 7	9 50	52 3	10 2	53 0	10 14	53 57	10 25	54 53	10 37	45	43	9
4	48 16	9 16	49 13	9 28	50 9	9 39	51 6	9 51	52 3	10 3	53 0	10 15	53 56	10 27	54 53	10 38	46	44	9
																	47	44	9
6	48 16	9 17	49 12	9 29	50 9	9 40	51 6	9 52	52 3	10 4	52 59	10 16	53 56	10 28	54 53	10 40	48	45	10
8	48 15	9 18	49 12	9 30	50 9	9 42	51 5	9 53	52 2	10 5	52 59	10 17	53 56	10 29	54 52	10 41	49	46	10
10	48 15	9 19	49 12	9 31	50 8	9 43	51 5	9 54	52 2	10 6	52 58	10 18	53 55	10 30	54 52	10 42	50	47	10
																	51	48	10
12	46 15	9 20	49 11	9 32	50 8	9 44	51 5	9 56	52 1	10 7	52 58	10 19	53 55	10 31	54 51	10 43	52	49	10
14	48 14	9 21	49 11	9 33	50 8	9 45	51 4	9 57	52 1	10 8	52 58	10 20	53 54	10 32	54 51	10 44	53	50	11
16	48 14	9 22	49 11	9 34	50 7	9 46	51 4	9 58	52 1	10 10	52 57	10 21	53 54	10 33	54 51	10 45	54	51	11
																	55	52	11
18	48 14	9 23	49 10	9 35	50 7	9 47	51 4	9 59	52 0	10 11	52 57	10 23	53 54	10 35	54 50	10 46	56	53	11
20	48 13	9 24	49 10	9 36	50 7	9 48	51 3	10 0	52 0	10 12	52 57	10 24	53 53	10 36	54 50	10 48	57	54	11
22	48 13	9 25	49 10	9 37	50 6	9 49	51 3	10 1	52 0	10 13	52 56	10 25	53 53	10 37	54 49	10 49	58	55	12
																	59	56	12
24	48 13	9 26	49 9	9 38	50 6	9 50	51 3	10 2	51 59	10 14	52 56	10 26	53 52	10 38	54 49	10 50	Alt.	☉	☆
26	48 12	9 27	49 9	9 39	50 6	9 51	51 2	10 3	51 59	10 15	52 55	10 27	53 52	10 39	54 49	10 51	°		
28	48 12	9 28	49 9	9 40	50 5	9 52	51 2	10 4	51 59	10 16	52 55	10 28	53 52	10 40	54 48	10 52	3	8	8
																	4	6	5
30	48 12	9 29	49 8	9 41	50 5	9 53	51 1	10 5	51 58	10 17	52 55	10 29	53 51	10 41	54 48	10 53	5	4	4
32	48 11	9 30	49 8	9 42	50 5	9 54	51 1	10 6	51 58	10 18	52 54	10 30	53 51	10 42	54 47	10 54	6	3	3
34	48 11	9 31	49 8	9 43	50 4	9 55	51 1	10 7	51 57	10 19	52 54	10 31	53 50	10 44	54 47	10 56	7	3	2
																	8	2	2
36	48 11	9 32	49 7	9 44	50 4	9 56	51 0	10 8	51 57	10 21	52 54	10 33	53 50	10 45	54 47	10 57	9	2	1
38	48 11	9 33	49 7	9 45	50 4	9 57	51 0	10 10	51 57	10 22	52 53	10 34	53 50	10 46	54 46	10 58	10	2	1
40	48 10	9 34	49 7	9 46	50 3	9 58	51 0	10 11	51 56	10 23	52 53	10 35	53 49	10 47	54 46	10 59	11	2	1
																	12	2	1
42	48 10	9 35	49 6	9 47	50 3	10 0	50 59	10 12	51 56	10 24	52 52	10 36	53 49	10 48	54 45	11 0	13	3	2
44	48 10	9 36	49 6	9 48	50 2	10 1	50 59	10 13	51 56	10 25	52 52	10 37	53 48	10 49	54 45	11 1	14	3	2
46	48 9	9 37	49 6	9 49	50 2	10 2	50 59	10 14	51 55	10 26	52 52	10 38	53 48	10 50	54 45	11 3	15	3	2
																	16	3	2
48	48 9	9 38	49 5	9 50	50 2	10 3	50 58	10 15	51 55	10 27	52 51	10 39	53 48	10 51	54 44	11 4	17	3	2
50	48 8	9 39	49 5	9 51	50 1	10 4	50 58	10 16	51 54	10 28	52 51	10 40	53 47	10 53	54 44	11 5	18	3	2
52	48 8	9 40	49 5	9 52	50 1	10 5	50 57	10 17	51 54	10 29	52 50	10 41	53 47	10 54	54 43	11 6	19	3	2
																	20	3	2
54	48 8	9 41	49 4	9 53	50 1	10 6	50 57	10 18	51 54	10 30	52 50	10 42	53 46	10 55	54 43	11 7	21	3	2
56	48 7	9 42	49 4	9 54	50 0	10 7	50 57	10 19	51 53	10 31	52 50	10 43	53 46	10 56	54 42	11 8	22	3	2
58	48 7	9 43	49 4	9 55	50 0	10 8	50 56	10 20	51 53	10 32	52 49	10 45	53 46	10 57	54 42	11 10	23	3	2
																	24	3	2
																	25	3	2
																	26	3	2
																	27	3	2
																	28	3	2
																	29	3	2
																	30	3	2
																	31	3	2
																	32	3	2
																	33	3	2
																	34	3	2
																	35	3	2
																	36	3	2
																	37	3	2
																	38	3	2
																	39	3	2
																	40	3	2
																	41	3	2
																	42	3	2
																	43	3	2
																	44	3	2
																	45	3	2
																	46	3	2
																	47	3	2
																	48	3	2
																	49	3	2
																	50	3	2
																	51	3	2
																	52	3	2
																	53	3	2
																	54	3	2
																	55	3	2
																	56	3	2
																	57	3	2
																	58	3	2
																	59	3	2
																	60	3	2

Correction of the Moon's Altitude, and the Aux. Angle A. (20° and 21°)

App Alt.	Minutes of Moon's Hor. Parallax. 54′		55′		56′		57′		58′		59′		60′		61′	
20°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
0′	48 7	9 44	49 3	9 57	50 0	10 9	50 56	10 21	51 52	10 34	52 49	10 46	53 45	10 58	54 42	11 11
2	48 6	9 45	49 3	9 58	49 59	10 10	50 56	10 22	51 52	10 35	52 48	10 47	53 45	11 0	54 41	11 12
4	48 6	9 46	49 2	9 59	49 59	10 11	50 55	10 24	51 52	10 36	52 48	10 48	53 44	11 1	54 41	11 13
6	48 6	9 47	49 2	10 0	49 58	10 12	50 55	10 25	51 51	10 37	52 47	10 49	53 44	11 2	54 40	11 14
8	48 5	9 48	49 2	10 1	49 58	10 13	50 54	10 26	51 51	10 38	52 47	10 50	53 43	11 3	54 40	11 15
10	48 5	9 49	49 1	10 2	49 58	10 14	50 54	10 27	51 50	10 39	52 47	10 52	53 43	11 4	54 39	11 16
12	48 5	9 51	49 1	10 3	49 57	10 15	50 54	10 28	51 50	10 40	52 46	10 53	53 42	11 5	54 39	11 18
14	48 4	9 52	49 0	10 4	49 57	10 16	50 53	10 29	51 49	10 41	52 46	10 54	53 42	11 6	54 38	11 19
16	48 4	9 53	49 0	10 5	49 56	10 17	50 53	10 30	51 49	10 42	52 45	10 55	53 42	11 7	54 38	11 20
18	48 3	9 54	49 0	10 6	49 56	10 19	50 52	10 31	51 49	10 44	52 45	10 56	53 41	11 8	54 37	11 21
20	48 3	9 55	48 59	10 7	49 56	10 20	50 52	10 32	51 48	10 45	52 44	10 57	53 41	11 10	54 37	11 22
22	48 3	9 56	48 59	10 8	49 55	10 21	50 51	10 33	51 48	10 46	52 44	10 58	53 40	11 11	54 37	11 23
24	48 2	9 57	48 58	10 9	49 55	10 22	50 51	10 34	51 47	10 47	52 44	10 59	53 40	11 12	54 36	11 24
26	48 2	9 58	48 58	10 10	49 54	10 23	50 51	10 35	51 47	10 48	52 43	11 0	53 39	11 13	54 36	11 26
28	48 1	9 59	48 58	10 11	49 54	10 24	50 50	10 36	51 46	10 49	52 43	11 2	53 39	11 14	54 35	11 27
30	48 1	10 0	48 57	10 12	49 54	10 25	50 50	10 37	51 46	10 50	52 42	11 3	53 38	11 15	54 35	11 28
32	48 1	10 1	48 57	10 13	49 53	10 26	50 49	10 39	51 46	10 51	52 42	11 4	53 38	11 16	54 34	11 29
34	48 0	10 2	48 56	10 14	49 53	10 27	50 49	10 40	51 45	10 52	52 41	11 5	53 37	11 18	54 34	11 30
36	48 0	10 3	48 56	10 15	49 52	10 28	50 48	10 41	51 45	10 53	52 41	11 6	53 37	11 19	54 33	11 31
38	47 59	10 4	48 56	10 16	49 52	10 29	50 48	10 42	51 44	10 54	52 40	11 7	53 37	11 20	54 33	11 32
40	47 59	10 5	48 55	10 17	49 51	10 30	50 48	10 43	51 44	10 55	52 40	11 8	53 36	11 21	54 32	11 34
42	47 59	10 6	48 55	10 18	49 51	10 31	50 47	10 44	51 43	10 57	52 40	11 9	53 36	11 22	54 32	11 35
44	47 58	10 7	48 54	10 19	49 51	10 32	50 47	10 45	51 43	10 58	52 39	11 10	53 35	11 23	54 31	11 36
46	47 58	10 8	48 54	10 21	49 50	10 33	50 46	10 46	51 42	10 59	52 39	11 12	53 35	11 24	54 31	11 37
48	47 58	10 9	48 54	10 22	49 50	10 34	50 46	10 47	51 42	11 0	52 38	11 13	53 34	11 25	54 30	11 38
50	47 57	10 10	48 53	10 23	49 49	10 35	50 45	10 48	51 42	11 1	52 38	11 14	53 34	11 26	54 30	11 39
52	47 57	10 11	48 53	10 24	49 49	10 36	50 45	10 49	51 41	11 2	52 37	11 15	53 33	11 28	54 29	11 40
54	47 56	10 12	48 52	10 25	49 49	10 37	50 45	10 50	51 41	11 3	52 37	11 16	53 33	11 29	54 29	11 42
56	47 56	10 13	48 52	10 26	49 48	10 38	50 44	10 51	51 40	11 4	52 36	11 17	53 32	11 30	54 28	11 43
58	47 56	10 14	48 52	10 27	49 48	10 40	50 44	10 52	51 40	11 5	52 36	11 18	53 32	11 31	54 28	11 44
21°	54′		55′		56′		57′		58′		59′		60′		61′	
0′	47 55	10 15	48 51	10 28	49 47	10 41	50 43	10 53	51 39	11 6	52 35	11 19	53 31	11 32	54 27	11 45
2	47 55	10 16	48 51	10 29	49 47	10 42	50 43	10 55	51 39	11 7	52 35	11 20	53 31	11 33	54 27	11 46
4	47 54	10 17	48 50	10 30	49 46	10 43	50 42	10 56	51 38	11 9	52 34	11 21	53 30	11 34	54 26	11 47
6	47 54	10 18	48 50	10 31	49 46	10 44	50 42	10 57	51 38	11 10	52 34	11 23	53 30	11 35	54 26	11 48
8	47 53	10 19	48 49	10 32	49 45	10 45	50 41	10 58	51 37	11 11	52 33	11 24	53 29	11 36	54 25	11 49
10	47 53	10 20	48 49	10 33	49 45	10 46	50 41	10 59	51 37	11 12	52 33	11 25	53 29	11 38	54 25	11 51
12	47 52	10 21	48 48	10 34	49 44	10 47	50 40	11 0	51 36	11 13	52 32	11 26	53 28	11 39	54 24	11 52
14	47 52	10 22	48 48	10 35	49 44	10 48	50 40	11 1	51 36	11 14	52 32	11 27	53 28	11 40	54 24	11 53
16	47 52	10 23	48 48	10 36	49 43	10 49	50 39	11 2	51 35	11 15	52 31	11 28	53 27	11 41	54 23	11 54
18	47 51	10 24	48 47	10 37	49 43	10 50	50 39	11 3	51 35	11 16	52 31	11 29	53 27	11 42	54 23	11 55
20	47 51	10 25	48 47	10 38	49 43	10 51	50 38	11 4	51 34	11 17	52 30	11 30	53 26	11 43	54 22	11 56
22	47 50	10 26	48 46	10 39	49 42	10 52	50 38	11 5	51 34	11 18	52 30	11 31	53 26	11 44	54 22	11 57
24	47 50	10 27	48 46	10 40	49 42	10 53	50 37	11 6	51 33	11 19	52 29	11 32	53 25	11 45	54 21	11 58
26	47 49	10 28	48 45	10 41	49 41	10 54	50 37	11 7	51 33	11 20	52 29	11 33	53 25	11 47	54 21	12 0
28	47 49	10 29	48 45	10 42	49 41	10 55	50 37	11 8	51 32	11 21	52 28	11 34	53 24	11 48	54 20	12 1
30	47 49	10 30	48 44	10 43	49 40	10 56	50 36	11 9	51 32	11 22	52 28	11 36	53 24	11 49	54 19	12 2
32	47 48	10 31	48 44	10 44	49 40	10 57	50 36	11 10	51 31	11 24	52 27	11 37	53 23	11 50	54 19	12 3
34	47 46	10 32	48 44	10 45	49 39	10 58	50 35	11 11	51 31	11 25	52 27	11 38	53 23	11 51	54 18	12 4
36	47 47	10 33	48 43	10 46	49 39	10 59	50 35	11 13	51 30	11 26	52 26	11 39	53 22	11 52	54 18	12 5
38	47 47	10 34	48 43	10 47	49 38	11 0	50 34	11 14	51 30	11 27	52 26	11 40	53 22	11 53	54 17	12 6
40	47 46	10 35	48 42	10 48	49 38	11 1	50 34	11 15	51 29	11 28	52 25	11 41	53 21	11 54	54 17	12 8
42	47 46	10 36	48 42	10 49	49 37	11 3	50 33	11 16	51 29	11 29	52 25	11 42	53 20	11 56	54 16	12 9
44	47 45	10 37	48 41	10 50	49 37	11 4	50 33	11 17	51 28	11 30	52 24	11 43	53 20	11 57	54 16	12 10
46	47 45	10 38	48 41	10 51	49 36	11 5	50 32	11 18	51 28	11 31	52 24	11 44	53 19	11 58	54 15	12 11
48	47 45	10 39	48 40	10 52	49 36	11 6	50 32	11 19	51 27	11 32	52 23	11 46	53 19	11 59	54 15	12 12
50	47 44	10 40	48 40	10 53	49 35	11 7	50 31	11 20	51 27	11 33	52 23	11 47	53 18	12 0	54 14	12 13
52	47 44	10 41	48 39	10 54	49 35	11 8	50 31	11 21	51 26	11 34	52 22	11 48	53 18	12 1	54 13	12 15
54	47 43	10 42	48 39	10 55	49 35	11 9	50 30	11 22	51 26	11 36	52 22	11 49	53 17	12 2	54 13	12 16
56	47 43	10 43	48 38	10 56	49 34	11 10	50 30	11 23	51 25	11 37	52 21	11 50	53 17	12 3	54 12	12 17
58	47 42	10 44	48 38	10 57	49 34	11 11	50 29	11 24	51 25	11 38	52 21	11 51	53 16	12 5	54 12	12 18

Seconds of H. P.		
″	Corr. ″	A ″
1	1	0
2	2	0
3	3	1
4	4	1
5	5	1
6	6	1
7	7	2
8	7	2
9	8	2
10	9	2
11	10	2
12	11	3
13	12	3
14	13	3
15	14	3
16	15	3
17	16	4
18	17	4
19	18	4
20	19	4
21	20	5
22	21	5
23	21	5
24	22	5
25	23	5
26	24	6
27	25	6
28	26	6
29	27	6
30	28	7
31	29	7
32	30	7
33	31	7
34	32	7
35	33	8
36	34	8
37	34	8
38	35	8
39	36	8
40	37	9
41	38	9
42	39	9
43	40	9
44	41	10
45	42	10
46	43	10
47	44	10
48	45	10
49	46	11
50	47	11
51	48	11
52	48	11
53	49	11
54	50	12
55	51	12
56	52	12
57	53	12
58	54	13
59	55	13

App Alt.	A ☉	A ☾
°	″	″
3	8	8
4	6	5
5	4	4
6	3	3
7	3	2
8	2	2
9	2	1
10	2	1
20	2	0
30	3	0
40	3	0
50	4	0
60	4	0
70	5	0
90	5	1

(22° and 23°) Correction of the Moon's Altitude, and the Aux. Angle A.

App. Alt.	Minutes of Moon's Hor. Parallax. 54′		55′		56′		57′		58′		59′		60′		61′	
22°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. −	A 60°	Corr. −	A 60°
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
0′	47 42	10 45	48 37	10 58	49 33	11 12	50 29	11 25	51 24	11 39	52 20	11 52	53 16	12 6	54 11	12 19
2	47 41	10 46	48 37	11 0	49 32	11 13	50 28	11 26	51 24	11 40	52 19	11 53	53 15	12 7	54 11	12 20
4	47 41	10 47	48 36	11 1	49 32	11 14	50 28	11 27	51 23	11 41	52 19	11 54	53 14	12 8	54 10	12 21
6	47 40	10 48	48 36	11 2	49 31	11 15	50 27	11 29	51 23	11 42	52 18	11 55	53 14	12 9	54 10	12 22
8	47 40	10 49	48 35	11 3	49 31	11 16	50 27	11 30	51 22	11 43	52 18	11 57	53 13	12 10	54 9	12 24
10	47 39	10 50	48 35	11 4	49 30	11 17	50 26	11 31	51 22	11 44	52 17	11 58	53 13	12 11	54 8	12 25
12	47 39	10 51	48 34	11 5	49 30	11 18	50 26	11 32	51 21	11 45	52 17	11 59	53 12	12 12	54 8	12 26
14	47 38	10 52	48 34	11 6	49 29	11 19	50 25	11 33	51 21	11 46	52 16	12 0	53 12	12 13	54 7	12 27
16	47 38	10 53	48 33	11 7	49 29	11 20	50 24	11 34	51 20	11 47	52 16	12 1	53 11	12 15	54 7	12 28
18	47 37	10 54	48 33	11 8	49 28	11 21	50 24	11 35	51 20	11 49	52 15	12 2	53 11	12 16	54 6	12 29
20	47 37	10 55	48 32	11 9	49 28	11 22	50 23	11 36	51 19	11 50	52 14	12 3	53 10	12 17	54 5	12 30
22	47 36	10 56	48 32	11 10	49 27	11 23	50 23	11 37	51 18	11 51	52 14	12 4	53 9	12 18	54 5	12 32
24	47 36	10 57	48 31	11 11	49 27	11 24	50 22	11 38	51 18	11 52	52 13	12 5	53 9	12 19	54 4	12 33
26	47 35	10 58	48 31	11 12	49 26	11 25	50 22	11 39	51 17	11 53	52 13	12 6	53 8	12 20	54 4	12 34
28	47 35	10 59	48 30	11 13	49 26	11 26	50 21	11 40	51 17	11 54	52 12	12 8	53 8	12 21	54 3	12 35
30	47 34	11 0	48 30	11 14	49 25	11 27	50 21	11 41	51 16	11 55	52 12	12 9	53 7	12 22	54 3	12 36
32	47 34	11 1	48 29	11 15	49 25	11 28	50 20	11 42	51 16	11 56	52 11	12 10	53 7	12 23	54 2	12 37
34	47 33	11 2	48 29	11 16	49 24	11 30	50 20	11 43	51 15	11 57	52 11	12 11	53 6	12 25	54 1	12 38
36	47 33	11 3	48 28	11 17	49 24	11 31	50 19	11 44	51 15	11 58	52 10	12 12	53 5	12 26	54 1	12 39
38	47 32	11 4	48 28	11 18	49 23	11 32	50 19	11 45	51 14	11 59	52 9	12 13	53 5	12 27	54 0	12 41
40	47 32	11 5	48 27	11 19	49 23	11 33	50 18	11 46	51 13	12 0	52 9	12 14	53 4	12 28	54 0	12 42
42	47 31	11 6	48 27	11 20	49 22	11 34	50 17	11 47	51 13	12 1	52 8	12 15	53 4	12 29	53 59	12 43
44	47 31	11 7	48 26	11 21	49 22	11 35	50 17	11 49	51 12	12 2	52 8	12 16	53 3	12 30	53 58	12 44
46	47 30	11 8	48 26	11 22	49 21	11 36	50 16	11 50	51 12	12 3	52 7	12 17	53 2	12 31	53 58	12 45
48	47 30	11 9	48 25	11 23	49 20	11 37	50 16	11 51	51 11	12 5	52 6	12 18	53 2	12 32	53 57	12 46
50	47 29	11 10	48 25	11 24	49 20	11 38	50 15	11 52	51 11	12 6	52 6	12 19	53 1	12 33	53 57	12 47
52	47 29	11 11	48 24	11 25	49 19	11 39	50 15	11 53	51 10	12 7	52 5	12 21	53 1	12 34	53 56	12 48
54	47 28	11 12	48 24	11 26	49 19	11 40	50 14	11 54	51 9	12 8	52 5	12 22	53 0	12 36	53 55	12 50
56	47 28	11 13	48 23	11 27	49 18	11 41	50 14	11 55	51 9	12 9	52 4	12 23	52 59	12 37	53 55	12 51
58	47 27	11 14	48 23	11 28	49 18	11 42	50 13	11 56	51 8	12 10	52 4	12 24	52 59	12 38	53 54	12 52

23°	54′		55′		56′		57′		58′		59′		60′		61′	
0′	47 27	11 15	48 22	11 29	49 17	11 43	50 12	11 57	51 8	12 11	52 3	12 25	52 58	12 39	53 53	12 53
2	47 26	11 16	48 21	11 30	49 17	11 44	50 12	11 58	51 7	12 12	52 2	12 26	52 58	12 40	53 53	12 54
4	47 26	11 17	48 21	11 31	49 16	11 45	50 11	11 59	51 7	12 13	52 2	12 27	52 57	12 41	53 52	12 55
6	47 25	11 18	48 20	11 32	49 16	11 46	50 11	12 0	51 6	12 14	52 1	12 28	52 56	12 42	53 52	12 56
8	47 25	11 19	48 20	11 33	49 15	11 47	50 10	12 1	51 5	12 15	52 1	12 29	52 56	12 43	53 51	12 57
10	47 24	11 20	48 19	11 34	49 14	11 48	50 10	12 2	51 5	12 16	52 0	12 30	52 55	12 44	53 50	12 58
12	47 24	11 21	48 19	11 35	49 14	11 49	50 9	12 3	51 4	12 17	51 59	12 31	52 55	12 45	53 50	13 0
14	47 23	11 22	48 18	11 36	49 13	11 50	50 9	12 4	51 4	12 18	51 59	12 33	52 54	12 47	53 49	13 1
16	47 23	11 23	48 18	11 37	49 13	11 51	50 8	12 5	51 3	12 19	51 58	12 34	52 53	12 48	53 49	13 2
18	47 22	11 24	48 17	11 38	49 12	11 52	50 7	12 6	51 3	12 21	51 58	12 35	52 53	12 49	53 48	13 3
20	47 21	11 25	48 17	11 39	49 12	11 53	50 7	12 7	51 2	12 22	51 57	12 36	52 52	12 50	53 47	13 4
22	47 21	11 26	48 16	11 40	49 11	11 54	50 6	12 9	51 1	12 23	51 56	12 37	52 52	12 51	53 47	13 5
24	47 20	11 27	48 15	11 41	49 11	11 55	50 6	12 10	51 1	12 24	51 56	12 38	52 51	12 52	53 46	13 6
26	47 20	11 28	48 15	11 42	49 10	11 56	50 5	12 11	51 0	12 25	51 55	12 39	52 50	12 53	53 45	13 7
28	47 19	11 29	48 14	11 43	49 9	11 57	50 5	12 12	51 0	12 26	51 55	12 40	52 50	12 54	53 45	13 9
30	47 19	11 30	48 14	11 44	49 9	11 58	50 4	12 13	50 59	12 27	51 54	12 41	52 49	12 55	53 44	13 10
32	47 18	11 31	48 13	11 45	49 8	11 59	50 3	12 14	50 58	12 28	51 53	12 42	52 48	12 56	53 44	13 11
34	47 18	11 32	48 13	11 46	49 8	12 0	50 3	12 15	50 58	12 29	51 53	12 43	52 48	12 58	53 43	13 12
36	47 17	11 33	48 12	11 47	49 7	12 2	50 2	12 16	50 57	12 30	51 52	12 44	52 47	12 59	53 42	13 13
38	47 17	11 34	48 12	11 48	49 7	12 3	50 2	12 17	50 57	12 31	51 52	12 46	52 47	13 0	53 42	13 14
40	47 16	11 35	48 11	11 49	49 6	12 4	50 1	12 18	50 56	12 32	51 51	12 47	52 46	13 1	53 41	13 15
42	47 16	11 36	48 11	11 50	49 6	12 5	50 0	12 19	50 55	12 33	51 50	12 48	52 45	13 2	53 40	13 16
44	47 15	11 37	48 10	11 51	49 5	12 6	50 0	12 20	50 55	12 34	51 50	12 49	52 45	13 3	53 40	13 18
46	47 14	11 38	48 9	11 52	49 4	12 7	49 59	12 21	50 54	12 35	51 49	12 50	52 44	13 4	53 39	13 19
48	47 14	11 39	48 9	11 53	49 4	12 8	49 59	12 22	50 54	12 37	51 48	12 51	52 43	13 4	53 38	13 20
50	47 13	11 40	48 8	11 54	49 3	12 9	49 58	12 23	50 53	12 38	51 48	12 52	52 43	13 6	53 38	13 21
52	47 13	11 41	48 8	11 55	49 3	12 10	49 57	12 24	50 52	12 39	51 47	12 53	52 42	13 8	53 37	13 22
54	47 12	11 42	48 7	11 56	49 2	12 11	49 57	12 25	50 52	12 40	51 47	12 54	52 42	13 9	53 36	13 23
56	47 12	11 43	48 7	11 57	49 1	12 12	49 56	12 26	50 51	12 41	51 46	12 55	52 41	13 10	53 36	13 24
58	47 11	11 44	48 6	11 58	49 1	12 13	49 56	12 27	50 51	12 42	51 45	12 56	52 40	13 11	53 35	13 25

Seconds of H. P.	Corr.	A
″	″	″
1	1	0
2	2	0
3	3	1
4	4	1
5	5	1
6	6	1
7	6	2
8	7	2
9	8	2
10	9	2
11	10	3
12	11	3
13	12	3
14	13	3
15	14	4
16	15	4
17	16	4
18	17	4
19	17	4
20	18	5
21	19	5
22	20	5
23	21	5
24	22	6
25	23	6
26	24	6
27	25	6
28	26	7
29	27	7
30	28	7
31	28	7
32	29	8
33	30	8
34	31	8
35	32	8
36	33	8
37	34	9
38	35	9
39	36	9
40	37	9
41	38	10
42	39	10
43	39	10
44	40	10
45	41	11
46	42	11
47	43	11
48	44	11
49	45	11
50	46	12
51	47	12
52	48	12
53	49	12
54	50	13
55	50	13
56	51	13
57	52	13
58	53	14
59	54	14
App. Alt.	☉	●
°	′	′
3	8	8
4	6	5
5	4	4
6	3	3
7	3	2
8	2	2
9	2	1
10	2	1
20	2	0
30	2	0
40	3	0
50	4	0
60	4	0
70	5	0
90	5	0

Correction of the Moon's Altitude, and the Aux. Angle A. (24° and 25°)

App. Alt.	Minutes of Moon's Hor. Parallax. 54′		55′		56′		57′		58′		59′		60′		61′	
24°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
0′	47 11	11 45	48 5	11 59	49 0	12 14	49 55	12 28	50 50	12 43	51 45	12 57	52 40	13 12	53 34	13 26
2	47 10	11 46	48 5	12 0	49 0	12 15	49 54	12 29	50 49	12 44	51 44	12 58	52 39	13 13	53 34	13 28
4	47 9	11 47	48 4	12 1	48 59	12 16	49 54	12 30	50 49	12 45	51 43	13 0	52 38	13 14	53 33	13 29
6	47 9	11 48	48 4	12 2	48 58	12 17	49 53	12 31	50 48	12 46	51 43	13 1	52 38	13 15	53 32	13 30
8	47 8	11 49	48 3	12 3	48 58	12 18	49 53	12 33	50 47	12 47	51 42	13 2	52 37	13 16	53 32	13 31
10	47 8	11 50	48 2	12 4	48 57	12 19	49 52	12 34	50 47	12 48	51 41	13 3	52 36	13 17	53 31	13 32
12	47 7	11 51	48 2	12 5	48 57	12 20	49 51	12 35	50 46	12 49	51 41	13 4	52 36	13 19	53 30	13 33
14	47 7	11 52	48 1	12 6	48 56	12 21	49 51	12 36	50 45	12 50	51 40	13 5	52 35	13 20	53 30	13 34
16	47 6	11 53	48 1	12 7	48 55	12 22	49 50	12 37	50 45	12 51	51 40	13 6	52 34	13 21	53 29	13 35
18	47 5	11 54	48 0	12 8	48 55	12 23	49 50	12 38	50 44	12 52	51 39	13 7	52 34	13 22	53 28	13 36
20	47 5	11 55	48 0	12 9	48 54	12 24	49 49	12 39	50 44	12 53	51 38	13 8	52 33	13 23	53 28	13 38
22	47 4	11 56	47 59	12 10	48 54	12 25	49 48	12 40	50 43	12 55	51 38	13 9	52 32	13 24	53 27	13 39
24	47 4	11 57	47 58	12 11	48 53	12 26	49 48	12 41	50 42	12 56	51 37	13 10	52 32	13 25	53 26	13 40
26	47 3	11 58	47 58	12 12	48 52	12 27	49 47	12 42	50 42	12 57	51 36	13 11	52 31	13 26	53 26	13 41
28	47 3	11 59	47 57	12 13	48 52	12 28	49 46	12 43	50 41	12 58	51 36	13 12	52 30	13 27	53 25	13 42
30	47 2	12 0	47 57	12 14	48 51	12 29	49 46	12 44	50 40	12 59	51 35	13 14	52 30	13 28	53 24	13 43
32	47 1	12 1	47 56	12 15	48 51	12 30	49 45	12 45	50 40	13 0	51 34	13 15	52 29	13 29	53 24	13 44
34	47 1	12 2	47 55	12 16	48 50	12 31	49 44	12 46	50 39	13 1	51 34	13 16	52 28	13 31	53 23	13 45
36	47 0	12 3	47 55	12 17	48 49	12 32	49 44	12 47	50 38	13 2	51 33	13 17	52 28	13 32	53 22	13 46
38	47 0	12 4	47 54	12 18	48 49	12 33	49 43	12 48	50 38	13 3	51 32	13 18	52 27	13 33	53 21	13 48
40	46 59	12 4	47 53	12 19	48 48	12 34	49 43	12 49	50 37	13 4	51 32	13 19	52 26	13 34	53 21	13 49
42	46 58	12 5	47 53	12 20	48 47	12 35	49 42	12 50	50 37	13 5	51 31	13 20	52 26	13 35	53 20	13 50
44	46 58	12 6	47 52	12 21	48 47	12 36	49 41	12 51	50 36	13 6	51 31	13 21	52 25	13 36	53 19	13 51
46	46 57	12 7	47 52	12 22	48 46	12 37	49 41	12 52	50 35	13 7	51 30	13 22	52 24	13 37	53 19	13 52
48	46 57	12 8	47 51	12 23	48 46	12 38	49 40	12 53	50 35	13 8	51 29	13 23	52 24	13 38	53 18	13 53
50	46 56	12 9	47 50	12 24	48 45	12 39	49 39	12 54	50 34	13 9	51 28	13 24	52 23	13 39	53 17	13 54
52	46 55	12 10	47 50	12 25	48 44	12 40	49 39	12 55	50 33	13 10	51 28	13 25	52 22	13 40	53 17	13 55
54	46 55	12 11	47 49	12 26	48 44	12 41	49 38	12 56	50 33	13 11	51 27	13 26	52 22	13 41	53 16	13 56
56	46 54	12 12	47 49	12 27	48 43	12 42	49 38	12 57	50 32	13 12	51 26	13 28	52 21	13 43	53 15	13 58
58	46 54	12 13	47 48	12 28	48 43	12 43	49 37	12 58	50 31	13 14	51 26	13 29	52 20	13 44	53 15	13 59
25°	54′		55′		56′		57′		58′		59′		60′		61′	
0′	46 53	12 14	47 47	12 29	48 42	12 44	49 36	12 59	50 31	13 15	51 25	13 30	52 19	13 45	53 14	14 0
2	46 52	12 15	47 47	12 30	48 41	12 45	49 36	13 1	50 30	13 16	51 24	13 31	52 19	13 46	53 13	14 1
4	46 52	12 16	47 46	12 31	48 41	12 46	49 35	13 2	50 29	13 17	51 24	13 32	52 18	13 47	53 12	14 2
6	46 51	12 17	47 46	12 32	48 40	12 47	49 34	13 3	50 29	13 18	51 23	13 33	52 17	13 48	53 12	14 3
8	46 51	12 18	47 45	12 33	48 39	12 48	49 34	13 4	50 28	13 19	51 22	13 34	52 17	13 49	53 11	14 4
10	46 50	12 19	47 44	12 34	48 39	12 49	49 33	13 5	50 27	13 20	51 22	13 35	52 16	13 50	53 10	14 5
12	46 49	12 20	47 44	12 35	48 38	12 51	49 32	13 6	50 27	13 21	51 21	13 36	52 15	13 51	53 10	14 6
14	46 49	12 21	47 43	12 36	48 37	12 52	49 32	13 7	50 26	13 22	51 20	13 37	52 14	13 52	53 9	14 7
16	46 48	12 22	47 42	12 37	48 37	12 53	49 31	13 8	50 25	13 23	51 19	13 38	52 14	13 53	53 8	14 9
18	46 47	12 23	47 42	12 38	48 36	12 54	49 30	13 9	50 24	13 24	51 19	13 39	52 13	13 55	53 7	14 10
20	46 47	12 24	47 41	12 39	48 35	12 55	49 30	13 10	50 24	13 25	51 18	13 40	52 12	13 56	53 7	14 11
22	46 46	12 25	47 40	12 40	48 35	12 56	49 29	13 11	50 23	13 26	51 17	13 41	52 12	13 57	53 6	14 12
24	46 46	12 26	47 40	12 41	48 34	12 57	49 28	13 12	50 22	13 27	51 17	13 42	52 11	13 58	53 5	14 13
26	46 45	12 27	47 39	12 42	48 33	12 58	49 28	13 13	50 22	13 28	51 16	13 43	52 10	13 59	53 4	14 14
28	46 44	12 28	47 38	12 43	48 33	12 59	49 27	13 14	50 21	13 29	51 15	13 45	52 9	14 0	53 4	14 15
30	46 44	12 29	47 38	12 44	48 32	13 0	49 26	13 15	50 20	13 30	51 15	13 46	52 9	14 1	53 3	14 16
32	46 43	12 30	47 37	12 45	48 31	13 1	49 26	13 16	50 20	13 31	51 14	13 47	52 8	14 2	53 2	14 17
34	46 42	12 31	47 37	12 46	48 31	13 2	49 25	13 17	50 19	13 32	51 13	13 48	52 7	14 3	53 1	14 18
36	46 42	12 32	47 36	12 47	48 30	13 3	49 24	13 18	50 18	13 33	51 12	13 49	52 7	14 4	53 1	14 20
38	46 41	12 33	47 35	12 48	48 30	13 4	49 23	13 19	50 18	13 34	51 12	13 50	52 6	14 5	53 0	14 21
40	46 40	12 34	47 35	12 49	48 29	13 5	49 23	13 20	50 17	13 35	51 11	13 51	52 5	14 6	52 59	14 22
42	46 40	12 35	47 34	12 50	48 28	13 6	49 22	13 21	50 16	13 36	51 10	13 52	52 5	14 7	52 58	14 23
44	46 39	12 36	47 33	12 51	48 27	13 7	49 21	13 22	50 16	13 37	51 10	13 53	52 4	14 8	52 58	14 24
46	46 39	12 37	47 33	12 52	48 27	13 8	49 21	13 23	50 15	13 38	51 9	13 54	52 4	14 9	52 57	14 25
48	46 38	12 38	47 32	12 53	48 26	13 9	49 20	13 24	50 14	13 39	51 8	13 55	52 3	14 10	52 56	14 26
50	46 37	12 39	47 31	12 54	48 25	13 10	49 19	13 25	50 13	13 40	51 7	13 56	52 2	14 11	52 55	14 27
52	46 37	12 40	47 31	12 55	48 25	13 11	49 19	13 26	50 13	13 41	51 7	13 57	52 1	14 12	52 55	14 28
54	46 36	12 41	47 30	12 56	48 24	13 12	49 18	13 27	50 12	13 42	51 6	13 58	52 0	14 13	52 54	14 29
56	46 35	12 42	47 29	12 57	48 23	13 13	49 17	13 28	50 11	13 43	51 5	13 59	51 59	14 14	52 53	14 31
58	46 35	12 43	47 29	12 58	48 23	13 14	49 17	13 29	50 11	13 44	51 5	14 0	51 58	14 15	52 52	14 32

Seconds of H. P.	Corr.	A
″	″	″
1	1	0
2	2	1
3	3	1
4	4	1
5	5	1
6	5	2
7	6	2
8	7	2
9	8	2
10	9	3
11	10	3
12	11	3
13	12	3
14	13	4
15	14	4
16	14	4
17	15	4
18	16	5
19	17	5
20	18	5
21	19	5
22	20	6
23	21	6
24	22	6
25	23	6
26	23	7
27	24	7
28	25	7
29	26	7
30	27	8
31	28	8
32	29	8
33	30	8
34	31	9
35	32	9
36	32	9
37	33	9
38	34	10
39	35	10
40	36	10
41	37	10
42	38	11
43	39	11
44	40	11
45	41	11
46	41	12
47	42	12
48	43	12
49	44	12
50	45	13
51	46	13
52	47	13
53	48	13
54	49	14
55	50	14
56	50	14
57	51	14
58	52	15
59	53	15
Alt.	☉	●
3	8	8
4	6	5
5	4	4
6	3	3
7	3	2
8	2	2
9	2	1
10	2	1
20	2	0
30	3	0
40	3	0
50	4	0
60	4	0
70	5	0
90	5	0

(26° and 27°) Correction of the Moon's Altitude, and the Aux. Angle A.

App. Alt.	Minutes of Moon's Hor. Parallax. 54′		55′		56′		57′		58′		59′		60′		61′	
26°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
0′	46 34	12 44	47 28	12 59	48 22	13 15	49 16	13 30	50 10	13 46	51 4	14 2	51 58	14 17	52 52	14 33
2	46 33	12 45	47 27	13 0	48 21	13 16	49 15	13 31	50 9	13 47	51 3	14 3	51 57	14 18	52 51	14 34
4	46 33	12 46	47 27	13 1	48 21	13 17	49 14	13 32	50 8	13 48	51 2	14 4	51 56	14 19	52 50	14 35
6	46 32	12 47	47 26	13 2	48 20	13 18	49 14	13 33	50 8	13 49	51 2	14 5	51 56	14 20	52 49	14 36
8	46 31	12 47	47 25	13 3	48 19	13 19	49 13	13 35	50 7	13 50	51 1	14 6	51 55	14 22	52 49	14 37
10	46 31	12 48	47 25	13 4	48 19	13 20	49 12	13 36	50 6	13 51	51 0	14 7	51 54	14 23	52 48	14 38
12	46 30	12 49	47 24	13 5	48 18	13 21	49 12	13 37	50 6	13 52	50 59	14 8	51 53	14 24	52 47	14 39
14	46 29	12 50	47 23	13 6	48 17	13 22	49 11	13 38	50 5	13 53	50 59	14 9	51 53	14 25	52 46	14 40
16	46 29	12 51	47 23	13 7	48 16	13 23	49 10	13 39	50 4	13 54	50 58	14 10	51 52	14 26	52 46	14 42
18	46 28	12 52	47 22	13 8	48 16	13 24	49 10	13 40	50 3	13 55	50 57	14 11	51 51	14 27	52 45	14 43
20	46 27	12 53	47 21	13 9	48 15	13 25	49 9	13 41	50 3	13 56	50 56	14 12	51 50	14 28	52 44	14 44
22	46 27	12 54	47 21	13 10	48 14	13 26	49 8	13 42	50 2	13 57	50 56	14 13	51 50	14 29	52 43	14 45
24	46 26	12 55	47 20	13 11	48 14	13 27	49 7	13 43	50 1	13 58	50 55	14 14	51 49	14 30	52 42	14 46
26	46 25	12 56	47 19	13 12	48 13	13 28	49 7	13 44	50 0	13 59	50 54	14 15	51 48	14 31	52 42	14 47
28	46 25	12 57	47 18	13 13	48 12	13 29	49 6	13 45	50 0	14 0	50 53	14 16	51 47	14 32	52 41	14 48
30	46 24	12 58	47 18	13 14	48 12	13 30	49 5	13 46	49 59	14 2	50 53	14 17	51 46	14 33	52 40	14 49
32	46 23	12 59	47 17	13 15	48 11	13 31	49 5	13 47	49 58	14 3	50 52	14 18	51 46	14 34	52 39	14 50
34	46 23	13 0	47 16	13 16	48 10	13 32	49 4	13 48	49 57	14 4	50 51	14 20	51 45	14 35	52 38	14 51
36	46 22	13 1	47 16	13 17	48 9	13 33	49 3	13 49	49 57	14 5	50 50	14 21	51 44	14 36	52 38	14 52
38	46 21	13 2	47 15	13 18	48 9	13 34	49 2	13 50	49 56	14 6	50 50	14 22	51 43	14 38	52 37	14 54
40	46 21	13 3	47 14	13 19	48 8	13 35	49 2	13 51	49 55	14 7	50 49	14 23	51 43	14 39	52 36	14 55
42	46 20	13 4	47 14	13 20	48 7	13 36	49 1	13 52	49 54	14 8	50 48	14 24	51 42	14 40	52 35	14 56
44	46 19	13 5	47 13	13 21	48 7	13 37	49 0	13 53	49 54	14 9	50 47	14 25	51 41	14 41	52 35	14 57
46	46 19	13 6	47 12	13 22	48 6	13 38	48 59	13 54	49 53	14 10	50 47	14 26	51 40	14 42	52 34	14 58
48	46 18	13 7	47 12	13 23	48 5	13 39	48 59	13 55	49 52	14 11	50 46	14 27	51 39	14 43	52 33	14 59
50	46 17	13 8	47 11	13 24	48 4	13 40	48 58	13 56	49 51	14 12	50 45	14 28	51 39	14 44	52 32	15 0
52	46 17	13 9	47 10	13 25	48 4	13 41	48 57	13 57	49 51	14 13	50 44	14 29	51 38	14 45	52 31	15 1
54	46 16	13 10	47 9	13 26	48 3	13 42	48 56	13 53	49 50	14 14	50 44	14 30	51 37	14 46	52 31	15 2
56	46 15	13 11	47 9	13 27	48 2	13 43	48 56	13 59	49 49	14 15	50 43	14 31	51 36	14 47	52 30	15 3
58	46 15	13 12	47 8	13 28	48 2	13 44	48 55	14 0	49 49	14 16	50 42	14 32	51 35	14 48	52 29	15 4

27°	54′		55′		56′		57′		58′		59′		60′		61′	
0′	46 14	13 13	47 7	13 29	48 1	13 45	48 54	14 1	49 48	14 17	50 41	14 33	51 35	14 49	52 28	15 5
2	46 13	13 14	47 7	13 30	48 0	13 46	48 54	14 2	49 47	14 18	50 41	14 34	51 34	14 50	52 27	15 7
4	46 12	13 14	47 6	13 31	47 59	13 47	48 53	14 3	49 46	14 19	50 40	14 35	51 33	14 52	52 27	15 8
6	46 12	13 15	47 5	13 32	47 59	13 48	48 52	14 4	49 46	14 20	50 39	14 36	51 32	14 53	52 26	15 9
8	46 11	13 16	47 5	13 33	47 58	13 49	48 51	14 5	49 45	14 21	50 38	14 37	51 32	14 54	52 25	15 10
10	46 10	13 17	47 4	13 34	47 57	13 50	48 51	14 6	49 44	14 22	50 37	14 38	51 31	14 55	52 24	15 11
12	46 10	13 18	47 3	13 35	47 56	13 51	48 50	14 7	49 43	14 23	50 37	14 39	51 30	14 56	52 23	15 12
14	46 9	13 19	47 2	13 35	47 56	13 52	48 49	14 8	49 42	14 24	50 36	14 41	51 29	14 57	52 23	15 13
16	46 8	13 20	47 2	13 36	47 55	13 53	48 48	14 9	49 42	14 25	50 35	14 42	51 28	14 58	52 22	15 14
18	46 8	13 21	47 1	13 37	47 54	13 54	48 48	14 10	49 41	14 26	50 34	14 43	51 28	14 59	52 21	15 15
20	46 7	13 22	47 0	13 38	47 53	13 55	48 47	14 11	49 40	14 27	50 33	14 44	51 27	15 0	52 20	15 16
22	46 6	13 23	46 59	13 39	47 53	13 56	48 46	14 12	49 39	14 28	50 33	14 45	51 26	15 1	52 19	15 17
24	46 5	13 24	46 59	13 40	47 52	13 57	48 45	14 13	49 39	14 29	50 32	14 46	51 25	15 2	52 18	15 19
26	46 5	13 25	46 58	13 41	47 51	13 58	48 44	14 14	49 38	14 30	50 31	14 47	51 24	15 3	52 18	15 20
28	46 4	13 26	46 57	13 42	47 50	13 59	48 44	14 15	49 37	14 32	50 30	14 48	51 24	15 4	52 17	15 21
30	46 3	13 27	46 56	13 43	47 50	14 0	48 43	14 16	49 36	14 33	50 29	14 49	51 23	15 5	52 16	15 22
32	46 3	13 28	46 56	13 44	47 49	14 1	48 42	14 17	49 35	14 34	50 29	14 50	51 22	15 6	52 15	15 23
34	46 2	13 29	46 55	13 45	47 48	14 2	48 41	14 18	49 35	14 35	50 28	14 51	51 21	15 8	52 14	15 24
36	46 1	13 30	46 54	13 46	47 47	14 3	48 41	14 19	49 34	14 36	50 27	14 52	51 20	15 9	52 13	15 25
38	46 0	13 31	46 54	13 47	47 47	14 4	48 40	14 20	49 33	14 37	50 26	14 53	51 19	15 10	52 13	15 26
40	46 0	13 32	46 53	13 48	47 46	14 5	48 39	14 21	49 32	14 38	50 25	14 54	51 19	15 11	52 12	15 27
42	45 59	13 33	46 52	13 49	47 45	14 6	48 38	14 22	49 32	14 39	50 25	14 55	51 18	15 12	52 11	15 28
44	45 58	13 34	46 51	13 50	47 44	14 7	48 38	14 23	49 31	14 40	50 24	14 56	51 17	15 13	52 10	15 29
46	45 57	13 35	46 51	13 51	47 44	14 8	48 37	14 24	49 30	14 41	50 23	14 57	51 16	15 14	52 9	15 30
48	45 57	13 36	46 50	13 52	47 43	14 9	48 36	14 25	49 29	14 42	50 22	14 58	51 15	15 15	52 8	15 31
50	45 56	13 36	46 49	13 53	47 42	14 10	48 35	14 26	49 28	14 43	50 21	14 59	51 14	15 16	52 8	15 33
52	45 55	13 37	46 48	13 54	47 41	14 11	48 35	14 27	49 28	14 44	50 21	15 0	51 14	15 17	52 7	15 34
54	45 55	13 38	46 48	13 55	47 41	14 12	48 34	14 28	49 27	14 45	50 20	15 1	51 13	15 18	52 6	15 35
56	45 54	13 39	46 47	13 56	47 40	14 13	48 33	14 29	49 26	14 46	50 19	15 3	51 12	15 19	52 5	15 36
58	45 53	13 40	46 46	13 57	47 39	14 14	48 32	14 30	49 25	14 47	50 18	15 4	51 11	15 20	52 4	15 37

Seconds of H. P.		
″	Corr.	A
	″	″
1	1	0
2	2	1
3	3	1
4	4	1
5	4	1
6	5	2
7	6	2
8	7	2
9	8	2
10	9	3
11	10	3
12	11	3
13	12	3
14	12	4
15	13	4
16	14	4
17	15	5
18	16	5
19	17	5
20	18	5
21	19	6
22	20	6
23	20	6
24	21	6
25	22	7
26	23	7
27	24	7
28	25	7
29	26	8
30	27	8
31	28	8
32	29	9
33	29	9
34	30	9
35	31	9
36	32	10
37	33	10
38	34	10
39	35	10
40	36	11
41	37	11
42	37	11
43	38	11
44	39	12
45	40	12
46	41	12
47	42	13
48	43	13
49	44	13
50	45	13
51	45	14
52	46	14
53	47	14
54	48	14
55	49	15
56	50	15
57	51	15
58	52	16
59	53	16

Alt.	A ☉	A ☽
	″	″
3°	8	8
4	6	5
5	4	4
6	3	3
7	3	2
8	2	2
9	2	1
10	2	1
20	2	0
30	3	0
40	3	0
50	4	0
60	4	0
70	5	0
90	5	0

Correction of the Moon's Altitude, and the Aux. Angle A. (28° and 29°)

App. Alt.	Minutes of Moon's Hor. Parallax. 54′		55′		56′		57′		58′		59′		60′		61′	
28°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
0′	45 52	13 41	46 45	13 58	47 38	14 15	48 31	14 31	49 24	14 48	50 17	15 5	51 10	15 21	52 3	15 38
2	45 52	13 42	46 45	13 59	47 38	14 16	48 31	14 32	49 24	14 49	50 17	15 6	51 10	15 22	52 3	15 39
4	45 51	13 43	46 44	14 0	47 37	14 17	48 30	14 33	49 23	14 50	50 16	15 7	51 9	15 23	52 2	15 40
6	45 50	13 44	46 43	14 1	47 36	14 18	48 29	14 34	49 22	14 51	50 15	15 8	51 8	15 24	52 1	15 41
8	45 49	13 45	46 42	14 2	47 35	14 19	48 28	14 35	49 21	14 52	50 14	15 9	51 7	15 25	52 0	15 42
10	45 49	13 46	46 42	14 3	47 35	14 20	48 27	14 36	49 20	14 53	50 13	15 10	51 6	15 27	51 59	15 43
12	45 48	13 47	46 41	14 4	47 34	14 21	48 27	14 37	49 20	14 54	50 12	15 11	51 5	15 28	51 58	15 44
14	45 47	13 48	46 40	14 5	47 33	14 22	48 26	14 38	49 19	14 55	50 12	15 12	51 5	15 29	51 57	15 45
16	45 46	13 49	46 39	14 6	47 32	14 23	48 25	14 39	49 18	14 56	50 11	15 13	51 4	15 30	51 57	15 47
18	45 46	13 50	46 38	14 7	47 31	14 24	48 24	14 40	49 17	14 57	50 10	15 14	51 3	15 31	51 56	15 48
20	45 45	13 51	46 38	14 8	47 31	14 24	48 23	14 41	49 16	14 58	50 9	15 15	51 2	15 32	51 55	15 49
22	45 44	13 52	46 37	14 9	47 30	14 25	48 23	14 42	49 16	14 59	50 8	15 16	51 1	15 33	51 54	15 50
24	45 43	13 53	46 36	14 10	47 29	14 26	48 22	14 43	49 15	15 0	50 8	15 17	51 0	15 34	51 53	15 51
26	45 43	13 54	46 36	14 11	47 28	14 27	48 21	14 44	49 14	15 1	50 7	15 18	51 0	15 35	51 52	15 52
28	45 42	13 55	46 35	14 11	47 28	14 28	48 20	14 45	49 13	15 2	50 6	15 19	50 59	15 36	51 51	15 33
30	45 41	13 56	46 34	14 12	47 27	14 29	48 20	14 46	49 12	15 3	50 5	15 20	50 58	15 37	51 50	15 54
32	45 40	13 56	46 33	14 13	47 26	14 30	48 19	14 47	49 11	15 4	50 4	15 21	50 57	15 38	51 50	15 55
34	45 40	13 57	46 32	14 14	47 25	14 31	48 18	14 48	49 11	15 5	50 3	15 22	50 56	15 39	51 49	15 56
36	45 39	13 58	46 32	14 15	47 24	14 32	48 17	14 49	49 10	15 6	50 2	15 23	50 55	15 40	51 48	15 57
38	45 38	13 59	46 31	14 16	47 24	14 33	48 16	14 50	49 9	15 7	50 2	15 24	50 54	15 41	51 47	15 58
40	45 37	14 0	46 30	14 17	47 23	14 34	48 15	14 51	49 8	15 8	50 1	15 25	50 53	15 42	51 46	15 59
42	45 37	14 1	46 29	14 18	47 22	14 35	48 15	14 52	49 7	15 9	50 0	15 26	50 53	15 43	51 45	16 0
44	45 36	14 2	46 29	14 19	47 21	14 36	48 14	14 53	49 6	15 10	49 59	15 28	50 52	15 45	51 44	16 2
46	45 35	14 3	46 28	14 20	47 20	14 37	48 13	14 54	49 6	15 12	49 58	15 29	50 51	15 46	51 43	16 3
48	45 34	14 4	46 27	14 21	47 20	14 38	48 12	14 55	49 5	15 13	49 57	15 30	50 50	15 47	51 43	16 4
50	45 34	14 5	46 26	14 22	47 19	14 39	48 11	14 56	49 4	15 14	49 57	15 31	50 49	15 48	51 42	16 5
52	45 33	14 6	46 25	14 23	47 18	14 40	48 11	14 57	49 3	15 15	49 56	15 32	50 48	15 49	51 41	16 6
54	45 32	14 7	46 25	14 24	47 17	14 41	48 10	14 58	49 2	15 16	49 55	15 33	50 47	15 50	51 40	16 7
56	45 31	14 8	46 24	14 25	47 16	14 42	48 9	14 59	49 1	15 17	49 54	15 34	50 46	15 51	51 39	16 8
58	45 31	14 9	46 23	14 26	47 16	14 43	48 8	15 0	49 1	15 18	49 53	15 35	50 46	15 52	51 38	16 9
29	54′		55′		56′		57′		58′		59′		60′		61′	
0′	45 30	14 10	46 22	14 27	47 15	14 44	48 7	15 2	49 0	15 19	49 52	15 36	50 45	15 53	51 37	16 10
2	45 29	14 11	46 22	14 28	47 14	14 45	48 6	15 3	48 59	15 20	49 51	15 37	50 44	15 54	51 36	16 11
4	45 28	14 12	46 21	14 29	47 13	14 46	48 6	15 4	48 58	15 21	49 51	15 38	50 43	15 55	51 36	16 12
6	45 27	14 13	46 20	14 30	47 12	14 47	48 5	15 5	48 57	15 22	49 50	15 39	50 42	15 56	51 35	16 13
8	45 27	14 13	46 19	14 31	47 12	14 48	48 4	15 5	48 56	15 23	49 49	15 40	50 41	15 57	51 34	16 14
10	45 26	14 14	46 18	14 32	47 11	14 49	48 3	15 6	48 56	15 24	49 48	15 41	50 40	15 58	51 33	16 15
12	45 25	14 15	46 18	14 33	47 10	14 50	48 2	15 7	48 55	15 25	49 47	15 42	50 40	15 59	51 32	16 16
14	45 24	14 16	46 17	14 34	47 9	14 51	48 2	15 8	48 54	15 26	49 46	15 43	50 39	16 0	51 31	16 18
16	45 24	14 17	46 16	14 35	47 8	14 52	48 1	15 9	48 53	15 27	49 45	15 44	50 38	16 1	51 30	16 19
18	45 23	14 18	46 15	14 36	47 8	14 53	48 0	15 10	48 52	15 28	49 45	15 45	50 37	16 2	51 29	16 20
20	45 22	14 19	46 14	14 37	47 7	14 54	47 59	15 11	48 51	15 29	49 44	15 46	50 36	16 3	51 28	16 21
22	45 21	14 20	46 14	14 38	47 6	14 55	47 58	15 12	48 51	15 30	49 43	15 47	50 35	16 4	51 27	16 22
24	45 21	14 21	46 13	14 38	47 5	14 56	47 57	15 13	48 50	15 31	49 42	15 48	50 34	16 5	51 27	16 23
26	45 20	14 22	46 12	14 39	47 4	14 57	47 57	15 14	48 49	15 32	49 41	15 49	50 33	16 6	51 26	16 24
28	45 19	14 23	46 11	14 40	47 3	14 58	47 56	15 15	48 48	15 33	49 40	15 50	50 32	16 7	51 25	16 25
30	45 18	14 24	46 10	14 41	47 3	14 59	47 55	15 16	48 47	15 34	49 39	15 51	50 32	16 8	51 24	16 26
32	45 17	14 25	46 10	14 42	47 2	15 0	47 54	15 17	48 46	15 35	49 38	15 52	50 31	16 10	51 23	16 27
34	45 17	14 26	46 9	14 43	47 1	15 1	47 53	15 18	48 45	15 36	49 38	15 53	50 30	16 11	51 22	16 28
36	45 16	14 27	46 8	14 44	47 0	15 2	47 52	15 19	48 45	15 37	49 37	15 54	50 29	16 12	51 21	16 29
38	45 15	14 28	46 7	14 45	46 59	15 3	47 51	15 20	48 44	15 38	49 36	15 55	50 28	16 13	51 20	16 30
40	45 14	14 29	46 6	14 46	46 58	15 4	47 51	15 21	48 43	15 39	49 35	15 56	50 27	16 14	51 19	16 31
42	45 13	14 30	46 5	14 47	46 58	15 5	47 50	15 22	48 42	15 40	49 34	15 57	50 26	16 15	51 18	16 32
44	45 13	14 30	46 5	14 48	46 57	15 6	47 49	15 23	48 41	15 41	49 33	15 58	50 25	16 16	51 17	16 33
46	45 12	14 31	46 4	14 49	46 56	15 7	47 48	15 24	48 40	15 42	49 32	15 59	50 24	16 17	51 16	16 34
48	45 11	14 32	46 3	14 50	46 55	15 7	47 47	15 25	48 39	15 43	49 31	16 0	50 23	16 18	51 16	16 35
50	45 10	14 33	46 2	14 51	46 54	15 8	47 46	15 26	48 38	15 44	49 30	16 1	50 23	16 19	51 15	16 36
52	45 9	14 34	46 1	14 52	46 53	15 9	47 45	15 27	48 38	15 45	49 30	16 2	50 22	16 20	51 14	16 38
54	45 9	14 35	46 1	14 53	46 53	15 10	47 45	15 28	48 37	15 46	49 29	16 3	50 21	16 21	51 13	16 39
56	45 8	14 36	46 0	14 54	46 52	15 11	47 44	15 29	48 36	15 47	49 28	16 4	50 20	16 22	51 12	16 40
58	45 7	14 37	45 59	14 55	46 51	15 12	47 43	15 30	48 35	15 48	49 27	16 5	50 19	16 23	51 11	16 41

Seconds of H. P.		
″	Corr.	A
	″	″
1	1	0
2	2	1
3	3	1
4	3	1
5	4	1
6	5	2
7	6	2
8	7	2
9	8	3
10	9	3
11	10	3
12	10	3
13	11	4
14	12	4
15	13	4
16	14	5
17	15	5
18	16	5
19	17	5
20	17	6
21	18	6
22	19	6
23	20	7
24	21	7
25	22	7
26	23	7
27	24	8
28	24	8
29	25	8
30	26	9
31	27	9
32	28	9
33	29	9
34	30	10
35	31	10
36	31	10
37	32	11
38	33	11
39	34	11
40	35	11
41	36	12
42	37	12
43	38	12
44	38	13
45	39	13
46	40	13
47	41	13
48	42	14
49	43	14
50	44	14
51	45	15
52	45	15
53	46	15
54	47	15
55	48	16
56	49	16
57	50	16
58	51	16
59	52	17

Alt.	A ☉	A ●
°	″	″
3	8	8
4	6	5
5	4	4
6	3	3
7	3	2
8	2	2
9	2	1
10	2	1
20	2	0
30	3	0
40	3	0
50	4	0
60	4	0
70	5	0
90	5	0

(30° and 31°) Correction of the Moon's Altitude, and the Aux. Angle A.

App Alt.	Minutes of Moon's Hor. Parallax. 54′		55′		56′		57′		58′		59		60′		61′	
30°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. −	A 60°	Corr. +	A 60°
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
0′	45 6	14 38	45 58	14 56	46 50	15 13	47 42	15 31	48 34	15 49	49 26	16 6	50 18	16 24	51 10	16 42
2	45 5	14 39	45 57	14 57	46 49	15 14	47 41	15 32	48 33	15 50	49 25	16 7	50 17	16 25	51 9	16 43
4	45 4	14 40	45 56	14 58	46 48	15 15	47 40	15 33	48 32	15 51	49 24	16 8	50 16	16 26	51 8	16 44
6	45 4	14 41	45 56	14 58	46 48	15 16	47 40	15 34	48 31	15 52	49 23	16 9	50 15	16 27	51 7	16 45
8	45 3	14 42	45 55	14 59	46 47	15 17	47 39	15 35	48 31	15 53	49 22	16 11	50 14	16 28	51 6	16 46
10	45 2	14 43	45 54	15 0	46 46	15 18	47 38	15 36	48 30	15 54	49 22	16 12	50 13	16 29	51 5	16 47
12	45 1	14 44	45 53	15 1	46 45	15 19	47 37	15 37	48 29	15 55	49 21	16 13	50 13	16 30	51 5	16 48
14	45 0	14 44	45 52	15 2	46 44	15 20	47 36	15 38	48 28	15 56	49 20	16 14	50 12	16 31	51 4	16 49
16	45 0	14 45	45 51	15 3	46 43	15 21	47 35	15 39	48 27	15 57	49 19	16 15	50 11	16 32	51 3	16 50
18	44 59	14 46	45 50	15 4	46 43	15 22	47 34	15 40	48 26	15 58	49 18	16 16	50 10	16 34	51 2	16 51
20	44 58	14 47	45 50	15 5	46 42	15 23	47 33	15 41	48 25	15 59	49 17	16 17	50 9	16 35	51 1	16 52
22	44 57	14 48	45 49	15 6	46 41	15 24	47 33	15 42	48 24	16 0	49 16	16 18	50 8	16 36	51 0	16 54
24	44 56	14 49	45 48	15 7	46 40	15 25	47 32	15 43	48 23	16 1	49 15	16 19	50 7	16 37	50 59	16 55
26	44 56	14 50	45 47	15 8	46 39	15 26	47 31	15 44	48 23	16 2	49 14	16 20	50 6	16 38	50 58	16 56
28	44 55	14 51	45 46	15 9	46 38	15 27	47 30	15 45	48 22	16 3	49 14	16 21	50 5	16 39	50 57	16 57
30	44 54	14 52	45 45	15 10	46 37	15 28	47 29	15 46	48 21	16 4	49 13	16 22	50 4	16 40	50 56	16 58
32	44 53	14 53	45 45	15 11	46 37	15 29	47 28	15 47	48 20	16 5	49 12	16 23	50 3	16 41	50 55	16 59
34	44 52	14 54	45 44	15 12	46 36	15 30	47 27	15 48	48 19	16 6	49 11	16 24	50 2	16 42	50 54	17 0
36	44 51	14 55	45 43	15 13	46 35	15 31	47 26	15 49	48 18	16 7	49 10	16 25	50 1	16 43	50 53	17 1
38	44 51	14 56	45 42	15 14	46 34	15 32	47 26	15 50	48 17	16 8	49 9	16 26	50 1	16 44	50 52	17 2
40	44 50	14 56	45 41	15 15	46 33	15 33	47 25	15 51	48 16	16 9	49 8	16 27	50 0	16 45	50 51	17 3
42	44 49	14 57	45 40	15 16	46 32	15 34	47 24	15 52	48 15	16 10	49 7	16 28	49 59	16 46	50 50	17 4
44	44 48	14 58	45 40	15 16	46 31	15 35	47 23	15 53	48 14	16 11	49 6	16 29	49 58	16 47	50 49	17 5
46	44 47	14 59	45 39	15 17	46 30	15 35	47 22	15 54	48 14	16 12	49 5	16 30	49 57	16 48	50 48	17 6
48	44 46	15 0	45 38	15 18	46 30	15 36	47 21	15 55	48 13	16 13	49 4	16 31	49 56	16 49	50 47	17 7
50	44 46	15 1	45 37	15 19	46 29	15 37	47 20	15 56	48 12	16 14	49 3	16 32	49 55	16 50	50 46	17 8
52	44 45	15 2	45 36	15 20	46 28	15 38	47 19	15 57	48 11	16 15	49 2	16 33	49 54	16 51	50 45	17 9
54	44 44	15 3	45 35	15 21	46 27	15 39	47 18	15 57	48 10	16 16	49 1	16 34	49 53	16 52	50 44	17 10
56	44 43	15 4	45 34	15 22	46 26	15 40	47 17	15 58	48 9	16 17	49 1	16 35	49 52	16 53	50 43	17 11
58	44 42	15 5	45 34	15 23	46 25	15 41	47 17	15 59	48 8	16 18	49 0	16 36	49 51	16 54	50 42	17 12
31°	54′		55′		56′		57′		58′		59′		60′		61′	
0′	44 41	15 6	45 33	15 24	46 24	15 42	47 16	16 0	48 7	16 19	48 59	16 37	49 50	16 55	50 41	17 13
2	44 41	15 7	45 32	15 25	46 23	15 43	47 15	16 1	48 6	16 20	48 58	16 38	49 49	16 56	50 41	17 14
4	44 40	15 8	45 31	15 26	46 23	15 44	47 14	16 2	48 5	16 21	48 57	16 39	49 48	16 57	50 40	17 15
6	44 39	15 9	45 30	15 27	46 22	15 45	47 13	16 3	48 4	16 22	48 56	16 40	49 47	16 58	50 39	17 16
8	44 38	15 9	45 29	15 28	46 21	15 46	47 12	16 4	48 3	16 23	48 55	16 41	49 46	16 59	50 38	17 17
10	44 37	15 10	45 28	15 29	46 20	15 47	47 11	16 5	48 3	16 24	48 54	16 42	49 45	17 0	50 37	17 18
12	44 36	15 11	45 28	15 30	46 19	15 48	47 10	16 6	48 2	16 25	48 53	16 43	49 44	17 1	50 36	17 20
14	44 35	15 12	45 27	15 31	46 18	15 49	47 9	16 7	48 1	16 26	48 52	16 44	49 43	17 2	50 35	17 21
16	44 35	15 13	45 26	15 32	46 17	15 50	47 8	16 8	48 0	16 27	48 51	16 45	49 42	17 3	50 34	17 22
18	44 34	15 14	45 25	15 32	46 16	15 51	47 8	16 9	47 59	16 28	48 50	16 46	49 41	17 4	50 33	17 23
20	44 33	15 15	45 24	15 33	46 15	15 52	47 7	16 10	47 58	16 28	48 49	16 47	49 40	17 5	50 32	17 24
22	44 32	15 16	45 23	15 34	46 14	15 53	47 6	16 11	47 57	16 29	48 48	16 48	49 39	17 6	50 31	17 25
24	44 31	15 17	45 22	15 35	46 14	15 54	47 5	16 12	47 56	16 30	48 47	16 49	49 38	17 7	50 30	17 26
26	44 30	15 18	45 21	15 36	46 13	15 55	47 4	16 13	47 55	16 31	48 46	16 50	49 37	17 8	50 29	17 27
28	44 30	15 19	45 20	15 37	46 12	15 56	47 3	16 14	47 54	16 32	48 45	16 51	49 37	17 9	50 28	17 28
30	44 29	15 20	45 20	15 38	46 11	15 57	47 2	16 15	47 53	16 33	48 44	16 52	49 36	17 10	50 27	17 29
32	44 28	15 21	45 19	15 39	46 10	15 57	47 1	16 16	47 52	16 34	48 43	16 53	49 35	17 11	50 26	17 30
34	44 27	15 21	45 18	15 40	46 9	15 58	47 0	16 17	47 51	16 35	48 42	16 54	49 34	17 12	50 25	17 31
36	44 26	15 22	45 17	15 41	46 8	15 59	46 59	16 18	47 50	16 36	48 42	16 55	49 33	17 13	50 24	17 32
38	44 25	15 23	45 16	15 42	46 7	16 0	46 58	16 19	47 49	16 37	48 41	16 56	49 32	17 14	50 23	17 33
40	44 24	15 24	45 15	15 43	46 6	16 1	46 57	16 20	47 48	16 38	48 40	16 57	49 31	17 15	50 22	17 34
42	44 23	15 25	45 14	15 44	46 5	16 2	46 57	16 21	47 48	16 39	48 39	16 58	49 30	17 17	50 21	17 35
44	44 22	15 26	45 13	15 45	46 5	16 3	46 56	16 22	47 47	16 40	48 38	16 59	49 29	17 18	50 20	17 36
46	44 22	15 27	45 12	15 46	46 4	16 4	46 55	16 23	47 46	16 41	48 37	17 0	49 28	17 19	50 19	17 37
48	44 21	15 28	45 12	15 46	46 3	16 5	46 54	16 24	47 45	16 42	48 36	17 1	49 27	17 20	50 18	17 38
50	44 20	15 29	45 11	15 47	46 2	16 6	46 53	16 25	47 44	16 43	48 35	17 2	49 26	17 21	50 17	17 39
52	44 19	15 30	45 10	15 48	46 1	16 7	46 52	16 26	47 43	16 44	48 34	17 3	49 25	17 22	50 16	17 40
54	44 18	15 31	45 9	15 49	46 0	16 8	46 51	16 27	47 42	16 45	48 33	17 4	49 24	17 23	50 15	17 41
56	44 17	15 31	45 8	15 50	45 59	16 9	46 50	16 28	47 41	16 46	48 32	17 5	49 23	17 24	50 14	17 42
58	44 16	15 32	45 7	15 51	45 58	16 10	46 49	16 29	47 40	16 47	48 31	17 6	49 22	17 25	50 13	17 43

Seconds of H. P.		
″	Corr.	A
	″	″
1	1	0
2	2	1
3	3	1
4	3	1
5	4	2
6	5	2
7	6	2
8	7	2
9	8	3
10	9	3
11	9	3
12	10	4
13	11	4
14	12	4
15	13	5
16	14	5
17	15	5
18	15	5
19	16	6
20	17	6
21	18	6
22	19	7
23	20	7
24	20	7
25	21	8
26	22	8
27	23	8
28	24	8
29	25	9
30	26	9
31	26	9
32	27	10
33	28	10
34	29	10
35	30	11
36	31	11
37	32	11
38	32	11
39	33	12
40	34	12
41	35	12
42	36	13
43	37	13
44	37	13
45	38	14
46	39	14
47	40	14
48	41	14
49	42	15
50	43	15
51	43	15
52	44	16
53	45	16
54	46	16
55	47	17
56	48	17
57	49	17
58	49	17
59	50	18

Alt.	A ☉	A *
°	′	′
3	8	8
4	6	5
5	4	4
6	3	3
7	3	2
8	2	2
9	2	1
10	2	1
20	2	0
30	3	0
40	3	0
50	4	0
60	4	0
70	5	0
80	5	0

Correction of the Moon's Altitude, and the Aux. Angle A. (32° and 33°)

App. Alt.	Minutes of Moon's Hor. Parallax. 54′		55′		56′		57′		58′		59′		60′		61′	
32°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
0′	44 15	15 33	45 6	15 52	45 57	16 11	46 48	16 29	47 39	16 48	48 30	17 7	49 21	17 26	50 12	17 44
2	44 14	15 34	45 5	15 53	45 56	16 12	46 47	16 30	47 38	16 49	48 29	17 8	49 20	17 27	50 11	17 45
4	44 14	15 35	45 4	15 54	45 55	16 13	46 46	16 31	47 37	16 50	48 28	17 9	49 19	17 28	50 10	17 46
6	44 13	15 36	45 4	15 55	45 54	16 14	46 45	16 32	47 36	16 51	48 27	17 10	49 18	17 29	50 9	17 47
8	44 12	15 37	45 3	15 56	45 53	16 15	46 44	16 33	47 35	16 52	48 26	17 11	49 17	17 30	50 8	17 49
10	44 11	15 38	45 2	15 57	45 52	16 15	46 43	16 34	47 34	16 53	48 25	17 12	49 16	17 31	50 7	17 50
12	44 10	15 39	45 1	15 58	45 52	16 16	46 42	16 35	47 33	16 54	48 24	17 13	49 15	17 32	50 6	17 51
14	44 9	15 40	45 0	15 59	45 51	16 17	46 41	16 36	47 32	16 55	48 23	17 14	49 14	17 33	50 4	17 52
16	44 8	15 41	44 59	15 59	45 50	16 18	46 40	16 37	47 31	16 56	48 22	17 15	49 13	17 34	50 3	17 53
18	44 7	15 41	44 58	16 0	45 49	16 19	46 39	16 38	47 30	16 57	48 21	17 16	49 12	17 35	50 2	17 54
20	44 6	15 42	44 57	16 1	45 48	16 20	46 38	16 39	47 29	16 58	48 20	17 17	49 11	17 36	50 1	17 55
22	44 6	15 43	44 56	16 2	45 47	16 21	46 38	16 40	47 28	16 59	48 19	17 18	49 10	17 37	50 0	17 56
24	44 5	15 44	44 55	16 3	45 46	16 22	46 37	16 41	47 27	17 0	48 18	17 19	49 9	17 38	49 59	17 57
26	44 4	15 45	44 54	16 4	45 45	16 23	46 36	16 42	47 26	17 1	48 17	17 20	49 8	17 39	49 58	17 58
28	44 3	15 46	44 53	16 5	45 44	16 24	46 35	16 43	47 25	17 2	48 16	17 21	49 7	17 40	49 57	17 59
30	44 2	15 47	44 53	16 6	45 43	16 25	46 34	16 44	47 24	17 3	48 15	17 22	49 6	17 41	49 56	18 0
32	44 1	15 48	44 52	16 7	45 42	16 26	46 33	16 45	47 24	17 4	48 14	17 23	49 5	17 42	49 55	18 1
34	44 0	15 49	44 51	16 8	45 41	16 27	46 32	16 46	47 23	17 5	48 13	17 24	49 4	17 43	49 54	18 2
36	43 59	15 50	44 50	16 9	45 40	16 28	46 31	16 47	47 22	17 6	48 12	17 25	49 3	17 44	49 53	18 3
38	43 58	15 51	44 49	16 10	45 40	16 29	46 30	16 48	47 21	17 7	48 11	17 26	49 2	17 45	49 52	18 4
40	43 57	15 51	44 48	16 11	45 39	16 30	46 29	16 49	47 20	17 8	48 10	17 27	49 1	17 46	49 51	18 5
42	43 57	15 52	44 47	16 12	45 38	16 31	46 28	16 50	47 19	17 9	48 9	17 28	49 0	17 47	49 50	18 6
44	43 56	15 53	44 46	16 12	45 37	16 31	46 27	16 51	47 18	17 10	48 8	17 29	48 59	17 48	49 49	18 7
46	43 55	15 54	44 45	16 13	45 36	16 32	46 26	16 52	47 17	17 11	48 7	17 30	48 58	17 49	49 48	18 8
48	43 54	15 55	44 44	16 14	45 35	16 33	46 25	16 53	47 16	17 12	48 6	17 31	48 57	17 50	49 47	18 9
50	43 53	15 56	44 43	16 15	45 34	16 34	46 24	16 53	47 15	17 13	48 5	17 32	48 56	17 51	49 46	18 10
52	43 52	15 57	44 43	16 16	45 33	16 35	46 23	16 54	47 14	17 14	48 4	17 33	48 55	17 52	49 45	18 11
54	43 51	15 58	44 42	16 17	45 32	16 36	46 22	16 55	47 13	17 15	48 3	17 34	48 54	17 53	49 44	18 12
56	43 50	15 59	44 41	16 18	45 31	16 37	46 21	16 56	47 12	17 16	48 2	17 35	48 53	17 54	49 43	18 13
58	43 49	16 0	44 40	16 19	45 30	16 38	46 20	16 57	47 11	17 17	48 1	17 36	48 52	17 55	49 42	18 14
33°	54′		55′		56′		57′		58′		59′		60′		61′	
0′	43 48	16 1	44 39	16 20	45 29	16 39	46 19	16 58	47 10	17 17	48 0	17 37	48 51	17 56	49 41	18 15
2	43 48	16 1	44 38	16 21	45 28	16 40	46 19	16 59	47 9	17 18	47 59	17 38	48 50	17 57	49 40	18 16
4	43 47	16 2	44 37	16 22	45 27	16 41	46 18	17 0	47 8	17 19	47 58	17 39	48 49	17 58	49 39	18 17
6	43 46	16 3	44 36	16 23	45 26	16 42	46 17	17 1	47 7	17 20	47 57	17 40	48 47	17 59	49 38	18 18
8	43 45	16 4	44 35	16 23	45 25	16 43	46 16	17 2	47 6	17 21	47 56	17 41	48 46	18 0	49 37	18 19
10	43 44	16 5	44 34	16 24	45 24	16 44	46 15	17 3	47 5	17 22	47 55	17 42	48 45	18 1	49 36	18 20
12	43 43	16 6	44 33	16 25	45 23	16 45	46 14	17 4	47 4	17 23	47 54	17 43	48 44	18 2	49 35	18 21
14	43 42	16 7	44 32	16 26	45 22	16 46	46 13	17 5	47 3	17 24	47 53	17 44	48 43	18 3	49 33	18 22
16	43 41	16 8	44 31	16 27	45 22	16 47	46 12	17 6	47 2	17 25	47 52	17 45	48 42	18 4	49 32	18 23
18	43 40	16 9	44 30	16 28	45 21	16 48	46 11	17 7	47 1	17 26	47 51	17 46	48 41	18 5	49 31	18 24
20	43 39	16 10	44 29	16 29	45 20	16 48	46 10	17 8	47 0	17 27	47 50	17 46	48 40	18 6	49 30	18 25
22	43 38	16 10	44 29	16 30	45 19	16 49	46 9	17 9	46 59	17 28	47 49	17 47	48 39	18 7	49 29	18 26
24	43 37	16 11	44 28	16 31	45 18	16 50	46 8	17 10	46 58	17 29	47 48	17 48	48 38	18 8	49 28	18 27
26	43 37	16 12	44 27	16 32	45 17	16 51	46 7	17 11	46 57	17 30	47 47	17 49	48 37	18 9	49 27	18 28
28	43 36	16 13	44 26	16 33	45 16	16 52	46 6	17 12	46 56	17 31	47 46	17 50	48 36	18 10	49 26	18 29
30	43 35	16 14	44 25	16 34	45 15	16 53	46 5	17 13	46 55	17 32	47 45	17 51	48 35	18 11	49 25	18 30
32	43 34	16 15	44 24	16 34	45 14	16 54	46 4	17 13	46 54	17 33	47 44	17 52	48 34	18 12	49 24	18 31
34	43 33	16 16	44 23	16 35	45 13	16 55	46 3	17 14	46 53	17 34	47 43	17 53	48 33	18 13	49 23	18 32
36	43 32	16 17	44 22	16 36	45 12	16 56	46 2	17 15	46 52	17 35	47 42	17 54	48 32	18 14	49 22	18 33
38	43 31	16 18	44 21	16 37	45 11	16 57	46 1	17 16	46 51	17 36	47 41	17 55	48 31	18 15	49 21	18 34
40	43 30	16 19	44 20	16 38	45 10	16 58	46 0	17 17	46 50	17 37	47 40	17 56	48 30	18 16	49 20	18 35
42	43 29	16 19	44 19	16 39	45 9	16 59	45 59	17 18	46 49	17 38	47 39	17 57	48 29	18 17	49 19	18 36
44	43 28	16 20	44 18	16 40	45 8	17 0	45 58	17 19	46 48	17 39	47 38	17 58	48 28	18 18	49 18	18 37
46	43 27	16 21	44 17	16 41	45 7	17 0	45 57	17 20	46 47	17 40	47 37	17 59	48 27	18 19	49 17	18 38
48	43 26	16 22	44 16	16 42	45 6	17 1	45 56	17 21	46 46	17 41	47 36	18 0	48 26	18 20	49 15	18 39
50	43 25	16 23	44 15	16 43	45 5	17 2	45 55	17 22	46 45	17 42	47 35	18 1	48 24	18 21	49 14	18 40
52	43 24	16 24	44 14	16 44	45 4	17 3	45 54	17 23	46 44	17 43	47 34	18 2	48 23	18 22	49 13	18 42
54	43 24	16 25	44 13	16 45	45 3	17 4	45 53	17 24	46 43	17 44	47 33	18 3	48 22	18 23	49 12	18 43
56	43 23	16 26	44 12	16 45	45 2	17 5	45 52	17 25	46 42	17 45	47 32	18 4	48 21	18 24	49 11	18 44
58	43 22	16 27	44 12	16 46	45 1	17 6	45 51	17 26	46 41	17 46	47 31	18 5	48 20	18 25	49 10	18 45

Seconds of H. P.		
″	Cor	A
	″	″
1	1	0
2	2	1
3	3	1
4	3	1
5	4	2
6	5	2
7	6	2
8	7	3
9	8	3
10	8	3
11	9	4
12	10	4
13	11	4
14	12	4
15	13	5
16	13	5
17	14	5
18	15	6
19	16	6
20	17	6
21	18	7
22	18	7
23	19	7
24	20	8
25	21	8
26	22	8
27	23	9
28	23	9
29	24	9
30	25	10
31	26	10
32	27	10
33	28	11
34	28	11
35	29	11
36	30	11
37	31	12
38	32	12
39	33	12
40	33	13
41	34	13
42	35	13
43	36	14
44	37	14
45	38	14
46	38	15
47	39	15
48	40	15
49	41	16
50	42	16
51	43	16
52	43	17
53	44	17
54	45	17
55	46	17
56	47	18
57	48	18
58	48	18
59	49	19
App. Alt.	☉	✱
3	8	8
4	6	5
5	4	4
6	3	3
7	3	2
8	2	2
9	2	1
10	2	1
20	2	0
30	3	0
40	3	0
50	4	0
60	4	0
90	5	0

(34° and 35°) Correction of the Moon's Altitude, and the Aux. Angle A.

App. Alt.	Minutes of Moon's Hor. Parallax. 54′		55′		56′		57′		58′		59′		60′		61′	
34°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
0′	43 21	16 28	44 11	16 47	45 0	17 7	45 50	17 27	46 40	17 46	47 30	18 6	48 19	18 26	49 9	18 46
2	43 20	16 28	44 10	16 48	44 59	17 8	45 49	17 28	46 39	17 47	47 29	18 7	48 18	18 27	49 8	18 47
4	43 19	16 29	44 9	16 49	44 58	17 9	45 48	17 29	46 38	17 48	47 27	18 8	48 17	18 28	49 7	18 48
6	43 18	16 30	44 8	16 50	44 57	17 10	45 47	17 30	46 37	17 49	47 26	18 9	48 16	18 29	49 6	18 49
8	43 17	16 31	44 7	16 51	44 56	17 11	45 46	17 30	46 36	17 50	47 25	18 10	48 15	18 30	49 5	18 50
10	43 16	16 32	44 6	16 52	44 55	17 12	45 45	17 31	46 35	17 51	47 24	18 11	48 14	18 31	49 4	18 51
12	43 15	16 33	44 5	16 53	44 54	17 13	45 44	17 32	46 34	17 52	47 23	18 12	48 13	18 32	49 2	18 52
14	43 14	16 34	44 4	16 54	44 53	17 13	45 43	17 33	46 33	17 53	47 22	18 13	48 12	18 33	49 1	18 53
16	43 13	16 35	44 3	16 55	44 52	17 14	45 42	17 34	46 31	17 54	47 21	18 14	48 11	18 34	49 0	18 54
18	43 12	16 36	44 2	16 55	44 51	17 15	45 41	17 35	46 30	17 55	47 20	18 15	48 10	18 35	48 59	18 55
20	43 11	16 36	44 1	16 56	44 50	17 16	45 40	17 36	46 29	17 56	47 19	18 16	48 9	18 36	48 58	18 56
22	43 10	16 37	44 0	16 57	44 49	17 17	45 39	17 37	46 28	17 57	47 18	18 17	48 7	18 37	48 57	18 57
24	43 9	16 38	43 59	16 58	44 48	17 18	45 38	17 38	46 27	17 58	47 17	18 18	48 6	18 38	48 56	18 58
26	43 8	16 39	43 58	17 0	44 47	17 19	45 37	17 39	46 26	17 59	47 16	18 19	48 5	18 39	48 55	18 59
28	43 7	16 40	43 57	17 1	44 46	17 20	45 36	17 40	46 25	18 0	47 15	18 20	48 4	18 40	48 54	19 0
30	43 6	16 41	43 56	17 2	44 45	17 21	45 35	17 41	46 24	18 1	47 14	18 21	48 3	18 41	48 53	19 1
32	43 5	16 42	43 55	17 3	44 44	17 22	45 34	17 42	46 23	18 2	47 13	18 22	48 2	18 42	48 51	19 2
34	43 4	16 43	43 54	17 4	44 43	17 23	45 33	17 43	46 22	18 3	47 12	18 23	48 1	18 43	48 50	19 3
36	43 3	16 44	43 53	17 4	44 42	17 24	45 32	17 44	46 21	18 4	47 10	18 24	48 0	18 44	48 49	19 4
38	43 2	16 44	43 52	17 5	44 41	17 24	45 31	17 44	46 20	18 5	47 9	18 25	47 59	18 45	48 48	19 5
40	43 1	16 45	43 51	17 5	44 40	17 25	45 29	17 45	46 19	18 5	47 8	18 25	47 58	18 45	48 47	19 6
42	43 0	16 46	43 50	17 6	44 39	17 26	45 28	17 46	46 18	18 6	47 7	18 26	47 57	18 46	48 46	19 7
44	42 59	16 47	43 49	17 7	44 38	17 27	45 27	17 47	46 17	18 7	47 6	18 27	47 55	18 47	48 45	19 8
46	42 59	16 48	43 48	17 8	44 37	17 28	45 26	17 48	46 16	18 8	47 5	18 28	47 54	18 48	48 44	19 9
48	42 58	16 49	43 47	17 9	44 36	17 29	45 25	17 49	46 15	18 9	47 4	18 29	47 53	18 49	48 43	19 10
50	42 57	16 50	43 46	17 10	44 35	17 30	45 24	17 50	46 14	18 10	47 3	18 30	47 52	18 50	48 41	19 11
52	42 56	16 51	43 45	17 11	44 34	17 31	45 23	17 51	46 13	18 11	47 2	18 31	47 51	18 51	48 40	19 12
54	42 55	16 52	43 44	17 12	44 33	17 32	45 22	17 52	46 12	18 12	47 1	18 32	47 50	18 52	48 39	19 13
56	42 54	16 52	43 43	17 13	44 32	17 33	45 21	17 53	46 11	18 13	47 0	18 33	47 49	18 53	48 38	19 14
58	42 53	16 53	43 42	17 13	44 31	17 34	45 20	17 54	46 10	18 14	46 59	18 34	47 48	18 54	48 37	19 15
35°	54′		55′		56′		57′		58′		59′		60′		61′	
0′	42 52	16 54	43 41	17 14	44 30	17 35	45 19	17 55	46 8	18 15	46 58	18 35	47 47	18 55	48 36	19 16
2	42 51	16 55	43 40	17 15	44 29	17 36	45 18	17 56	46 7	18 16	46 57	18 36	47 46	18 56	48 35	19 17
4	42 50	16 56	43 39	17 16	44 28	17 36	45 17	17 57	46 6	18 17	46 55	18 37	47 45	18 57	48 34	19 18
6	42 49	16 57	43 38	17 17	44 27	17 37	45 16	17 58	46 5	18 18	46 54	18 38	47 43	18 58	48 33	19 19
8	42 48	16 58	43 37	17 18	44 26	17 38	45 15	17 59	46 4	18 19	46 53	18 39	47 42	18 59	48 31	19 20
10	42 47	16 59	43 36	17 19	44 25	17 39	45 14	17 59	46 3	18 20	46 52	18 40	47 41	19 0	48 30	19 21
12	42 46	16 59	43 35	17 20	44 24	17 40	45 13	18 0	46 2	18 21	46 51	18 41	47 40	19 1	48 29	19 22
14	42 45	17 0	43 34	17 21	44 23	17 41	45 12	18 1	46 1	18 22	46 50	18 42	47 39	19 2	48 28	19 23
16	42 44	17 1	43 33	17 22	44 22	17 42	45 11	18 2	46 0	18 23	46 49	18 43	47 38	19 3	48 27	19 24
18	42 43	17 2	43 32	17 22	44 21	17 43	45 10	18 3	45 59	18 23	46 48	18 44	47 37	19 4	48 26	19 25
20	42 42	17 3	43 31	17 23	44 20	17 44	45 9	18 4	45 58	18 24	46 47	18 45	47 36	19 5	48 25	19 25
22	42 41	17 4	43 30	17 24	44 19	17 45	45 8	18 5	45 57	18 25	46 46	18 46	47 34	19 6	48 23	19 26
24	42 40	17 5	43 29	17 25	44 18	17 46	45 7	18 6	45 56	18 26	46 44	18 47	47 33	19 7	48 22	19 27
26	42 39	17 6	43 28	17 26	44 17	17 46	45 6	18 7	45 54	18 27	46 43	18 48	47 32	19 8	48 21	19 28
28	42 38	17 6	43 27	17 27	44 16	17 47	45 4	18 8	45 53	18 28	46 42	18 49	47 31	19 9	48 20	19 29
30	42 37	17 7	43 26	17 28	44 15	17 48	45 3	18 9	45 52	18 29	46 41	18 50	47 30	19 10	48 19	19 30
32	42 36	17 8	43 25	17 29	44 14	17 49	45 2	18 10	45 51	18 30	46 40	18 50	47 29	19 11	48 18	19 31
34	42 35	17 9	43 24	17 30	44 12	17 50	45 1	18 11	45 50	18 31	46 39	18 51	47 28	19 12	48 17	19 32
36	42 34	17 10	43 23	17 30	44 11	17 51	45 0	18 11	45 49	18 32	46 38	18 52	47 27	19 13	48 16	19 33
38	42 33	17 11	43 22	17 31	44 10	17 52	44 59	18 12	45 48	18 33	46 37	18 53	47 26	19 14	48 14	19 34
40	42 32	17 12	43 21	17 32	44 9	17 53	44 58	18 13	45 47	18 34	46 36	18 54	47 24	19 15	48 13	19 35
42	42 31	17 13	43 20	17 33	44 8	17 54	44 57	18 14	45 46	18 35	46 35	18 55	47 23	19 16	48 12	19 36
44	42 30	17 13	43 19	17 34	44 7	17 55	44 56	18 15	45 45	18 36	46 34	18 56	47 22	19 17	48 11	19 37
46	42 29	17 14	43 18	17 35	44 6	17 56	44 55	18 16	45 44	18 37	46 32	18 57	47 21	19 18	48 10	19 38
48	42 28	17 15	43 17	17 36	44 5	17 56	44 54	18 17	45 43	18 38	46 31	18 58	47 20	19 19	48 9	19 39
50	42 27	17 16	43 16	17 37	44 4	17 57	44 53	18 18	45 42	18 38	46 30	18 59	47 19	19 20	48 8	19 40
52	42 26	17 17	43 15	17 38	44 3	17 58	44 52	18 19	45 41	18 39	46 29	19 0	47 18	19 21	48 6	19 41
54	42 25	17 18	43 14	17 38	44 2	17 59	44 51	18 20	45 39	18 40	46 28	19 1	47 17	19 22	48 5	19 42
56	42 24	17 19	43 13	17 39	44 1	18 0	44 50	18 21	45 38	18 41	46 27	19 2	47 16	19 23	48 4	19 43
58	42 23	17 20	43 12	17 40	44 0	18 1	44 49	18 22	45 37	18 42	46 26	19 3	47 14	19 24	48 3	19 44

Seconds of H. P.		
″	Corr	A
	″	″
1	1	0
2	2	1
3	2	1
4	3	1
5	4	2
6	5	2
7	6	2
8	7	3
9	7	3
10	8	3
11	9	4
12	10	4
13	11	4
14	11	5
15	12	5
16	13	5
17	14	6
18	15	6
19	15	6
20	16	7
21	17	7
22	18	7
23	19	8
24	20	8
25	20	8
26	21	9
27	22	9
28	23	9
29	24	10
30	24	10
31	25	10
32	26	11
33	27	11
34	28	11
35	29	12
36	29	12
37	30	12
38	31	13
39	32	13
40	33	13
41	33	14
42	34	14
43	35	14
44	36	15
45	37	15
46	38	15
47	38	16
48	39	16
49	40	16
50	41	17
51	42	17
52	42	17
53	43	18
54	44	18
55	45	18
56	46	19
57	47	19
58	47	19
59	48	20
App. Alt.	☉	*
	A	A
3	8	8
4	6	4
5	4	5
6	3	3
7	3	2
8	2	2
9	2	1
10	2	1
20	2	0
30	3	0
40	3	0
50	4	0
60	4	0
70	5	0
90	5	0

Correction of the Moon's Altitude, and the Aux. Angle A. (36° and 37°)

App. Alt.	Minutes of Moon's Hor. Parallax. 54′ Corr. +	A 60°	55′ Corr. +	A 60°	56′ Corr. +	A 60°	57′ Corr. +	A 60°	58′ Corr. +	A 60°	59′ Corr +	A 60°	60′ Corr. +	A 60°	61′ Corr. +	A 60°	Seconds of H. P. ″	Cor.	A ″
36°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	1	1	0
																	2	2	1
0′	42 22	17 20	43 10	17 41	43 59	18 2	44 48	18 23	45 36	18 43	46 25	19 4	47 13	19 25	48 2	19 45	3	2	1
2	42 21	17 21	43 9	17 42	43 58	18 3	44 47	18 24	45 35	18 44	46 24	19 5	47 12	19 26	48 1	19 46	4	3	1
4	42 20	17 22	43 8	17 43	43 57	18 4	44 45	18 24	45 34	18 45	46 23	19 6	47 11	19 27	48 0	19 47	5	4	2
																	6	5	2
6	42 19	17 23	43 7	17 44	43 56	18 5	44 44	18 25	45 33	18 46	46 21	19 7	47 10	19 27	47 58	19 48	7	6	2
8	42 18	17 24	43 6	17 45	43 55	18 5	44 43	18 26	45 32	18 47	46 20	19 8	47 9	19 28	47 57	19 49	8	6	3
10	42 17	17 25	43 5	17 46	43 54	18 6	44 42	18 27	45 31	18 48	46 19	19 9	47 8	19 29	47 56	19 50	9	7	3
12	42 16	17 26	43 4	17 46	43 53	18 7	44 41	18 28	45 30	18 49	46 18	19 10	47 6	19 30	47 55	19 51	10	8	3
14	42 15	17 27	43 3	17 47	43 52	18 8	44 40	18 29	45 28	18 50	46 17	19 10	47 5	19 31	47 54	19 52	11	9	4
16	42 14	17 27	43 2	17 48	43 51	18 9	44 39	18 30	45 27	18 51	46 16	19 11	47 4	19 32	47 53	19 53	12	10	4
																	13	10	5
18	42 13	17 28	43 1	17 49	43 49	18 10	44 38	18 31	45 26	18 52	46 15	19 12	47 3	19 33	47 51	19 54	14	11	5
20	42 12	17 29	43 0	17 50	43 48	18 11	44 37	18 32	45 25	18 52	46 13	19 13	47 2	19 34	47 50	19 55	15	12	5
22	42 11	17 30	42 59	17 51	43 47	18 12	44 36	18 33	45 24	18 53	46 12	19 14	47 1	19 35	47 49	19 56	16	13	6
																	17	14	6
24	42 10	17 31	42 58	17 52	43 46	18 13	44 35	18 34	45 23	18 54	46 11	19 15	46 59	19 36	47 48	19 57	18	14	6
26	42 9	17 32	42 57	17 53	43 45	18 14	44 34	18 34	45 22	18 55	46 10	19 16	46 58	19 37	47 47	19 58	19	15	7
28	42 8	17 33	42 56	17 54	43 44	18 14	44 32	18 35	45 21	18 56	46 9	19 17	46 57	19 38	47 46	19 59	20	16	7
30	42 7	17 33	42 55	17 54	43 43	18 15	44 31	18 36	45 20	18 57	46 8	19 18	46 56	19 39	47 44	20 0	21	17	7
32	42 6	17 34	42 54	17 55	43 42	18 16	44 30	18 37	45 18	18 58	46 7	19 19	46 55	19 40	47 43	20 1	22	18	8
34	42 4	17 35	42 53	17 56	43 41	18 17	44 29	18 38	45 17	18 59	46 6	19 20	46 54	19 41	47 42	20 2	23	18	8
																	24	19	8
36	42 3	17 36	42 52	17 57	43 40	18 18	44 28	18 39	45 16	19 0	46 4	19 21	46 53	19 42	47 41	20 3	25	20	9
38	42 2	17 37	42 51	17 58	43 39	18 19	44 27	18 40	45 15	19 1	46 3	19 22	46 51	19 43	47 40	20 4	26	21	9
40	42 1	17 38	42 50	17 59	43 38	18 20	44 26	18 41	45 14	19 2	46 2	19 23	46 50	19 45	47 38	20 5	27	22	9
																	28	22	10
42	42 0	17 39	42 49	18 0	43 37	18 21	44 25	18 42	45 13	19 3	46 1	19 24	46 49	19 46	47 37	20 6	29	23	10
44	41 59	17 40	42 47	18 1	43 36	18 22	44 24	18 43	45 12	19 4	46 0	19 25	46 48	19 47	47 36	20 7	30	24	10
46	41 58	17 40	42 46	18 2	43 35	18 23	44 23	18 44	45 11	19 5	45 59	19 26	46 47	19 47	47 35	20 8	31	25	11
																	32	26	11
48	41 57	17 41	42 45	18 2	43 33	18 23	44 22	18 44	45 10	19 6	45 58	19 27	46 46	19 48	47 34	20 9	33	26	12
50	41 56	17 42	42 44	18 3	43 32	18 24	44 20	18 45	45 8	19 6	45 57	19 28	46 45	19 49	47 33	20 10	34	27	12
52	41 55	17 43	42 43	18 4	43 31	18 25	44 19	18 46	45 7	19 7	45 55	19 28	46 43	19 50	47 31	20 11	35	28	12
54	41 54	17 44	42 42	18 5	43 30	18 26	44 18	18 47	45 6	19 8	45 54	19 29	46 42	19 51	47 30	20 12	36	29	13
56	41 53	17 45	42 41	18 6	43 29	18 27	44 17	18 48	45 5	19 9	45 53	19 30	46 41	19 52	47 29	20 13	37	30	13
58	41 52	17 46	42 40	18 7	43 28	18 28	44 16	18 49	45 4	19 10	45 52	19 31	46 40	19 53	47 28	20 14	38	30	13
																	39	31	14
37°	54′		55′		56′		57′		58′		59′		60′		61′		40	32	14
0′	41 51	17 46	42 39	18 8	43 27	18 29	44 15	18 50	45 3	19 11	45 51	19 32	46 39	19 53	47 27	20 15	41	33	14
2	41 50	17 47	42 38	18 9	43 26	18 30	44 14	18 51	45 2	19 12	45 50	19 33	46 38	19 54	47 26	20 16	42	34	15
4	41 49	17 48	42 37	18 9	43 25	18 31	44 13	18 52	45 1	19 13	45 49	19 34	46 37	19 55	47 24	20 17	43	34	15
																	44	35	15
6	41 48	17 49	42 36	18 10	43 24	18 31	44 12	18 53	45 0	19 14	45 47	19 35	46 35	19 56	47 23	20 17	45	36	16
8	41 47	17 50	42 35	18 11	43 23	18 32	44 11	18 54	44 58	19 15	45 46	19 36	46 34	19 57	47 22	20 18	46	37	16
10	41 46	17 51	42 34	18 12	43 22	18 33	44 9	18 54	44 57	19 16	45 45	19 37	46 33	19 58	47 21	20 19	47	38	16
																	48	38	17
12	41 45	17 52	42 33	18 13	43 20	18 34	44 8	18 55	44 56	19 17	45 44	19 38	46 32	19 59	47 20	20 20	49	39	17
14	41 44	17 53	42 32	18 14	43 19	18 35	44 7	18 56	44 55	19 17	45 43	19 39	46 31	20 0	47 18	20 21	50	40	18
16	41 43	17 53	42 30	18 15	43 18	18 36	44 6	18 57	44 54	19 18	45 42	19 40	46 29	20 1	47 17	20 22	51	41	18
																	52	42	18
18	41 42	17 54	42 29	18 15	43 17	18 37	44 5	18 58	44 53	19 19	45 40	19 41	46 28	20 2	47 16	20 23	53	42	19
20	41 41	17 55	42 28	18 16	43 16	18 38	44 4	18 59	44 51	19 20	45 39	19 41	46 27	20 3	47 15	20 24	54	43	19
22	41 40	17 56	42 27	18 17	43 15	18 38	44 3	19 0	44 50	19 21	45 38	19 42	46 26	20 4	47 13	20 25	55	44	19
																	56	45	20
24	41 38	17 57	42 26	18 18	43 14	18 39	44 2	19 1	44 49	19 22	45 37	19 43	46 25	20 5	47 12	20 26	57	46	20
26	41 37	17 58	42 25	18 19	43 13	18 40	44 0	19 2	44 48	19 23	45 36	19 44	46 23	20 6	47 11	20 27	58	46	20
28	41 36	17 58	42 24	18 20	43 12	18 41	43 59	19 3	44 47	19 24	45 35	19 45	46 22	20 7	47 10	20 28	59	47	21
30	41 35	17 59	42 23	18 21	43 11	18 42	43 58	19 3	44 46	19 25	45 33	19 46	46 21	20 8	47 9	20 29	═	═	═
32	41 34	18 0	42 22	18 22	43 9	18 43	43 57	19 4	44 45	19 26	45 32	19 47	46 20	20 8	47 7	20 30	Alt.	A ☉	A ☽
34	41 33	18 1	42 21	18 22	43 8	18 44	43 56	19 5	44 44	19 27	45 31	19 48	46 19	20 9	47 6	20 31			
																	3	8	8
36	41 32	18 2	42 20	18 23	43 7	18 45	43 55	19 6	44 42	19 28	45 30	19 49	46 18	20 10	47 5	20 32	4	6	5
38	41 31	18 3	42 19	18 24	43 6	18 46	43 54	19 7	44 41	19 28	45 29	19 50	46 16	20 11	47 4	20 33	5	4	4
40	41 30	18 3	42 18	18 25	43 5	18 46	43 53	19 8	44 40	19 29	45 28	19 51	46 15	20 12	47 3	20 34	6	3	3
																	7	3	2
42	41 29	18 4	42 17	18 26	43 4	18 47	43 51	19 9	44 39	19 30	45 27	19 52	46 14	20 13	47 1	20 35	8	2	2
44	41 28	18 5	42 15	18 28	43 3	18 48	43 50	19 10	44 38	19 31	45 25	19 53	46 13	20 14	47 0	20 36	9	2	1
46	41 27	18 6	42 14	18 29	43 2	18 49	43 49	19 11	44 37	19 32	45 24	19 54	46 12	20 15	46 59	20 37	10	2	1
48	41 26	18 7	42 13	18 30	43 1	18 50	43 48	19 12	44 36	19 33	45 23	19 55	46 10	20 16	46 58	20 38	20	2	0
50	41 25	18 8	42 12	18 31	43 0	18 51	43 47	19 12	44 34	19 34	45 22	19 55	46 9	20 17	46 57	20 39	30	3	0
52	41 24	18 9	42 11	18 33	42 58	18 52	43 46	19 13	44 33	19 35	45 21	19 56	46 8	20 18	46 55	20 40	40	3	0
																	50	4	0
54	41 23	18 10	42 10	18 34	42 57	18 53	43 45	19 14	44 32	19 36	45 20	19 57	46 7	20 19	46 54	20 41	60	4	0
56	41 22	18 10	42 9	18 35	42 56	18 54	43 44	19 15	44 31	19 37	45 18	19 58	46 6	20 20	46 53	20 42	70	5	0
58	41 21	18 11	42 8	18 36	42 55	18 54	43 43	19 16	44 30	19 38	45 17	19 59	46 4	20 21	46 52	20 43	90	5	0

(38° and 39°) Correction of the Moon's Altitude, and the Aux. Angle A.

App. Alt.	Minutes of Moon's Hor. Parallax. 54′		55′		56′		57′		58′		59′		60′		61′	
38°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
0′	41 19	18 12	42 7	18 34	42 54	18 55	43 41	19 17	44 29	19 39	45 16	20 0	46 3	20 22	46 51	20 43
2	41 18	18 13	42 6	18 35	42 53	18 56	43 40	19 18	44 28	19 39	45 15	20 1	46 2	20 23	46 49	20 44
4	41 17	18 14	42 5	18 35	42 52	18 57	43 39	19 19	44 26	19 40	45 14	20 2	46 1	20 24	46 48	20 45
6	41 16	18 15	42 3	18 36	42 51	18 58	43 38	19 20	44 25	19 41	45 12	20 3	46 0	20 25	46 47	20 46
8	41 15	18 15	42 2	18 37	42 50	18 59	43 37	19 21	44 24	19 42	45 11	20 4	45 58	20 26	46 46	20 47
10	41 14	18 16	42 1	18 38	42 48	19 0	43 36	19 21	44 23	19 43	45 10	20 5	45 57	20 27	46 44	20 48
12	41 13	18 17	42 0	18 39	42 47	19 1	43 34	19 22	44 22	19 44	45 9	20 6	45 56	20 27	46 43	20 49
14	41 12	18 18	41 59	18 40	42 46	19 1	43 33	19 23	44 20	19 45	45 8	20 7	45 55	20 28	46 42	20 50
16	41 11	18 19	41 58	18 41	42 45	19 2	43 32	19 24	44 19	19 46	45 6	20 8	45 54	20 29	46 41	20 51
18	41 10	18 20	41 57	18 41	42 44	19 3	43 31	19 25	44 18	19 47	45 5	20 8	45 52	20 30	46 39	20 52
20	41 9	18 20	41 56	18 42	42 43	19 4	43 30	19 26	44 17	19 48	45 4	20 9	45 51	20 31	46 38	20 53
22	41 8	18 21	41 55	18 43	42 42	19 5	43 29	19 27	44 16	19 48	45 3	20 10	45 50	20 32	46 37	20 54
24	41 6	18 22	41 53	18 44	42 41	19 6	43 28	19 28	44 15	19 49	45 2	20 11	45 49	20 33	46 36	20 55
26	41 5	18 23	41 52	18 45	42 39	19 7	43 26	19 29	44 13	19 50	45 0	20 12	45 47	20 34	46 34	20 56
28	41 4	18 24	41 51	18 46	42 38	19 8	43 25	19 29	44 12	19 51	44 59	20 13	45 46	20 35	46 33	20 57
30	41 3	18 25	41 50	18 47	42 37	19 8	43 24	19 30	44 11	19 52	44 58	20 14	45 45	20 36	46 32	20 58
32	41 2	18 26	41 49	18 47	42 36	19 9	43 23	19 31	44 10	19 53	44 57	20 15	45 44	20 37	46 31	20 59
34	41 1	18 26	41 48	18 48	42 35	19 10	43 22	19 32	44 9	19 54	44 56	20 16	45 43	20 38	46 30	21 0
36	41 0	18 27	41 47	18 49	42 34	19 11	43 21	19 33	44 8	19 55	44 54	20 17	45 41	20 39	46 28	21 1
38	40 59	18 28	41 46	18 50	42 33	19 12	43 20	19 34	44 6	19 56	44 53	20 18	45 40	20 40	46 27	21 1
40	40 58	18 29	41 45	18 51	42 31	19 13	43 18	19 35	44 5	19 57	44 52	20 18	45 39	20 40	46 26	21 2
42	40 57	18 30	41 44	18 52	42 30	19 14	43 17	19 36	44 4	19 58	44 51	20 19	45 38	20 41	46 25	21 3
44	40 56	18 31	41 42	18 53	42 29	19 15	43 16	19 36	44 3	19 58	44 50	20 20	45 36	20 42	46 23	21 4
46	40 55	18 31	41 41	18 53	42 28	19 15	43 15	19 37	44 2	19 59	44 48	20 21	45 35	20 43	46 22	21 5
48	40 53	18 32	41 40	18 54	42 27	19 16	43 14	19 38	44 0	20 0	44 47	20 22	45 34	20 44	46 21	21 6
50	40 52	18 33	41 39	18 55	42 26	19 17	43 13	19 39	43 59	20 1	44 46	20 23	45 33	20 45	46 20	21 7
52	40 51	18 34	41 38	18 56	42 25	19 18	43 11	19 40	43 58	20 2	44 45	20 24	45 32	20 46	46 18	21 8
54	40 50	18 35	41 37	18 57	42 24	19 19	43 10	19 41	43 57	20 3	44 44	20 25	45 30	20 47	46 17	21 9
56	40 49	18 36	41 36	18 58	42 22	19 20	43 9	19 42	43 56	20 4	44 42	20 26	45 29	20 48	46 16	21 10
58	40 48	18 37	41 35	18 59	42 21	19 21	43 8	19 43	43 55	20 5	44 41	20 27	45 28	20 49	46 15	21 11

39°	54′		55′		56′		57′		58′		59′		60′		61′	
0′	40 47	18 37	41 33	18 59	42 20	19 21	43 7	19 44	43 53	20 6	44 40	20 28	45 27	20 50	46 13	21 12
2	40 46	18 38	41 32	19 0	42 19	19 22	43 6	19 44	43 52	20 7	44 39	20 29	45 26	20 51	46 12	21 13
4	40 45	18 39	41 31	19 1	42 18	19 23	43 4	19 45	43 51	20 7	44 38	20 30	45 24	20 52	46 11	21 14
6	40 44	18 40	41 30	19 2	42 17	19 24	43 3	19 46	43 50	20 8	44 36	20 30	45 23	20 53	46 10	21 15
8	40 42	18 41	41 29	19 3	42 16	19 25	43 2	19 47	43 49	20 9	44 35	20 31	45 22	20 53	46 8	21 16
10	40 41	18 42	41 28	19 4	42 14	19 26	43 1	19 48	43 47	20 10	44 34	20 32	45 21	20 54	46 7	21 17
12	40 40	18 42	41 27	19 5	42 13	19 27	43 0	19 49	43 46	20 11	44 33	20 33	45 19	20 55	46 6	21 18
14	40 39	18 43	41 26	19 5	42 12	19 28	42 58	19 50	43 45	20 12	44 31	20 34	45 18	20 56	46 5	21 18
16	40 38	18 44	41 24	19 6	42 11	19 28	42 57	19 51	43 44	20 13	44 30	20 35	45 17	20 57	46 3	21 19
18	40 37	18 45	41 23	19 7	42 10	19 29	42 56	19 51	43 43	20 14	44 29	20 36	45 16	20 58	46 2	21 20
20	40 36	18 46	41 22	19 8	42 9	19 30	42 55	19 52	43 41	20 15	44 28	20 37	45 14	20 59	46 1	21 21
22	40 35	18 47	41 21	19 9	42 7	19 31	42 54	19 53	43 40	20 15	44 27	20 38	45 13	21 0	45 59	21 22
24	40 33	18 47	41 20	19 10	42 6	19 32	42 53	19 54	43 39	20 16	44 25	20 39	45 12	21 1	45 58	21 23
26	40 32	18 48	41 19	19 10	42 5	19 33	42 51	19 55	43 38	20 17	44 24	20 40	45 10	21 2	45 57	21 24
28	40 31	18 49	41 18	19 11	42 4	19 34	42 50	19 56	43 37	20 18	44 23	20 40	45 9	21 3	45 56	21 25
30	40 30	18 50	41 16	19 12	42 3	19 34	42 49	19 57	43 35	20 19	44 22	20 41	45 8	21 4	45 54	21 26
32	40 29	18 51	41 15	19 13	42 2	19 35	42 48	19 58	43 34	20 20	44 20	20 42	45 7	21 5	45 53	21 27
34	40 28	18 52	41 14	19 14	42 0	19 36	42 47	19 58	43 33	20 21	44 19	20 43	45 6	21 5	45 52	21 28
36	40 27	18 53	41 13	19 15	41 59	19 37	42 46	19 59	43 32	20 22	44 18	20 44	45 4	21 6	45 51	21 29
38	40 26	18 53	41 12	19 16	41 58	19 38	42 44	20 0	43 31	20 23	44 17	20 45	45 3	21 7	45 49	21 30
40	40 25	18 54	41 11	19 16	41 57	19 39	42 43	20 1	43 29	20 23	44 16	20 46	45 2	21 8	45 48	21 31
42	40 23	18 55	41 10	19 17	41 56	19 40	42 42	20 2	43 28	20 24	44 14	20 47	45 0	21 9	45 47	21 32
44	40 22	18 56	41 9	19 18	41 54	19 40	42 41	20 3	43 27	20 25	44 13	20 48	44 59	21 10	45 45	21 32
46	40 21	18 56	41 7	19 19	41 53	19 41	42 40	20 4	43 26	20 26	44 12	20 49	44 58	21 11	45 44	21 33
48	40 20	18 57	41 6	19 20	41 52	19 42	42 38	20 5	43 25	20 27	44 11	20 49	44 57	21 12	45 43	21 34
50	40 19	18 58	41 5	19 21	41 51	19 43	42 37	20 5	43 23	20 28	44 9	20 50	44 56	21 13	45 42	21 35
52	40 18	18 59	41 4	19 21	41 50	19 44	42 36	20 6	43 22	20 29	44 8	20 51	44 54	21 14	45 40	21 36
54	40 17	19 0	41 3	19 22	41 49	19 45	42 35	20 7	43 21	20 30	44 7	20 52	44 53	21 15	45 39	21 37
56	40 16	19 1	41 2	19 23	41 48	19 46	42 34	20 8	43 20	20 31	44 6	20 53	44 52	21 16	45 38	21 38
58	40 15	19 2	41 1	19 24	41 47	19 47	42 33	20 9	43 19	20 32	44 5	20 54	44 51	21 17	45 37	21 39

Seconds of H. P.		
″	Corr.	A
	″	″
1	1	0
2	2	1
3	2	1
4	3	1
5	4	2
6	5	2
7	5	3
8	6	3
9	7	3
10	8	4
11	9	4
12	9	4
13	10	5
14	11	5
15	12	6
16	12	6
17	13	6
18	14	7
19	15	7
20	16	7
21	16	8
22	17	8
23	18	9
24	19	9
25	20	9
26	20	10
27	21	10
28	22	10
29	23	11
30	23	11
31	24	12
32	25	12
33	26	12
34	27	13
35	27	13
36	28	13
37	29	14
38	30	14
39	31	14
40	31	15
41	32	15
42	33	15
43	34	16
44	34	16
45	35	17
46	36	17
47	37	17
48	38	18
49	38	18
50	39	18
51	40	19
52	41	19
53	41	19
54	42	20
55	43	20
56	44	21
57	45	21
58	45	22
59	46	22

° Alt.	☉	●
	A	A
3	8	8
4	6	5
5	4	4
6	3	3
7	3	2
8	2	2
9	2	1
10	2	1
20	2	0
30	3	0
40	3	0
50	4	0
60	4	0
70	5	0
90	5	0

Correction of the Moon's Altitude, and the Aux. Angle A. (40° and 41°)

App. Alt.	Minutes of Moon's Hor. Parallax. 54′		55′		56′		57′		58′		59′		60′		61′	
40°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. −	A 60°
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
0′	40 13	19 2	40 59	19 25	41 45	19 47	42 31	20 10	43 17	20 32	44 3	20 55	44 49	21 17	45 35	21 40
2	40 12	19 3	40 58	19 26	41 44	19 48	42 30	20 11	43 16	20 33	44 2	20 56	44 48	21 18	45 34	21 41
4	40 11	19 4	40 57	19 26	41 43	19 49	42 29	20 12	43 15	20 34	44 1	20 57	44 47	21 19	45 33	21 42
6	40 10	19 5	40 56	19 27	41 42	19 50	42 28	20 13	43 14	20 35	43 59	20 58	44 45	21 20	45 31	21 43
8	40 9	19 6	40 55	19 28	41 41	19 51	42 27	20 13	43 12	20 36	43 58	20 58	44 44	21 21	45 30	21 44
10	40 8	19 6	40 54	19 29	41 39	19 52	42 25	20 14	43 11	20 37	43 57	20 59	44 43	21 22	45 29	21 45
12	40 6	19 7	40 52	19 30	41 38	19 52	42 24	20 15	43 10	20 38	43 56	21 0	44 42	21 23	45 27	21 46
14	40 5	19 8	40 51	19 31	41 37	19 53	42 23	20 16	43 9	20 39	43 54	21 1	44 40	21 24	45 26	21 46
16	40 4	19 9	40 50	19 32	41 36	19 54	42 22	20 17	43 7	20 39	43 53	21 2	44 39	21 25	45 25	21 47
18	40 3	19 10	40 49	19 32	41 35	19 55	42 20	20 18	43 6	20 40	43 52	21 3	44 38	21 26	45 24	21 48
20	40 2	19 10	40 48	19 33	41 33	19 56	42 19	20 18	43 5	20 41	43 51	21 4	44 36	21 26	45 22	21 49
22	40 1	19 11	40 47	19 34	41 32	19 57	42 18	20 19	43 4	20 42	43 49	21 5	44 35	21 27	45 21	21 50
24	40 0	19 12	40 45	19 35	41 31	19 57	42 17	20 20	43 2	20 43	43 48	21 6	44 34	21 28	45 20	21 51
26	39 58	19 13	40 44	19 36	41 30	19 58	42 16	20 21	43 1	20 44	43 47	21 7	44 33	21 29	45 18	21 52
28	39 57	19 14	40 43	19 36	41 29	19 59	42 14	20 22	43 0	20 45	43 46	21 8	44 31	21 30	45 17	21 53
30	39 56	19 15	40 42	19 37	41 27	20 0	42 13	20 23	42 59	20 46	43 44	21 8	44 30	21 31	45 16	21 54
32	39 55	19 15	40 41	19 38	41 26	20 1	42 12	20 24	42 58	20 46	43 43	21 9	44 29	21 32	45 14	21 55
34	39 54	19 16	40 40	19 39	41 25	20 2	42 11	20 25	42 56	20 47	43 42	21 10	44 28	21 33	45 13	21 56
36	39 53	19 17	40 38	19 40	41 24	20 3	42 10	20 25	42 55	20 48	43 41	21 11	44 26	21 34	45 12	21 57
38	39 52	19 18	40 37	19 41	41 23	20 3	42 8	20 26	42 54	20 49	43 39	21 12	44 25	21 35	45 10	21 57
40	39 50	19 19	40 36	19 41	41 22	20 4	42 7	20 27	42 53	20 50	43 38	21 13	44 24	21 36	45 9	21 58
42	39 49	19 19	40 35	19 42	41 20	20 5	42 6	20 28	42 51	20 51	43 37	21 14	44 22	21 37	45 8	21 59
44	39 48	19 20	40 34	19 43	41 19	20 6	42 5	20 29	42 50	20 52	43 36	21 14	44 21	21 37	45 7	22 0
46	39 47	19 21	40 33	19 44	41 18	20 7	42 3	20 30	42 49	20 53	43 34	21 15	44 20	21 38	45 5	22 1
48	39 46	19 22	40 31	19 45	41 17	20 8	42 2	20 31	42 48	20 53	43 33	21 16	44 19	21 39	45 4	22 2
50	39 45	19 23	40 30	19 46	41 16	20 9	42 1	20 31	42 46	20 54	43 32	21 17	44 17	21 40	45 3	22 3
52	39 44	19 24	40 29	19 46	41 14	20 9	42 0	20 32	42 45	20 55	43 31	21 18	44 16	21 41	45 1	22 4
54	39 43	19 24	40 28	19 47	41 13	20 10	41 59	20 33	42 44	20 56	43 29	21 19	44 15	21 42	45 0	22 5
56	39 41	19 25	40 27	19 48	41 12	20 11	41 57	20 34	42 43	20 57	43 28	21 20	44 13	21 43	44 59	22 6
58	39 40	19 26	40 26	19 49	41 11	20 12	41 56	20 35	42 41	20 58	43 27	21 21	44 12	21 44	44 57	22 7
41°	54′		55′		56′		57′		58′		59′		60′		61′	
0′	39 39	19 27	40 24	19 50	41 10	20 13	41 55	20 36	42 40	20 59	43 25	21 22	44 11	21 45	44 56	22 8
2	39 38	19 28	40 23	19 51	41 8	20 14	41 54	20 37	42 39	21 0	43 24	21 22	44 9	21 46	44 55	22 9
4	39 37	19 28	40 22	19 51	41 7	20 14	41 52	20 37	42 38	21 0	43 23	21 23	44 8	21 46	44 53	22 10
6	39 36	19 29	40 21	19 52	41 6	20 15	41 51	20 38	42 36	21 1	43 22	21 24	44 7	21 47	44 52	22 10
8	39 34	19 30	40 20	19 53	41 5	20 16	41 50	20 39	42 35	21 2	43 20	21 25	44 6	21 48	44 51	22 11
10	39 33	19 31	40 18	19 54	41 4	20 17	41 49	20 40	42 34	21 3	43 19	21 26	44 4	21 49	44 49	22 12
12	39 32	19 32	40 17	19 55	41 2	20 18	41 47	20 41	42 33	21 4	43 18	21 27	44 3	21 50	44 48	22 13
14	39 31	19 32	40 16	19 56	41 1	20 19	41 46	20 42	42 31	21 5	43 16	21 28	44 2	21 51	44 47	22 14
16	39 30	19 33	40 15	19 56	41 0	20 20	41 45	20 43	42 30	21 6	43 15	21 29	44 0	21 52	44 45	22 15
18	39 28	19 34	40 14	19 57	40 59	20 20	41 44	20 43	42 29	21 7	43 14	21 30	43 59	21 53	44 44	22 16
20	39 27	19 35	40 12	19 58	40 57	20 21	41 42	20 44	42 27	21 7	43 13	21 30	43 58	21 54	44 43	22 17
22	39 26	19 36	40 11	19 59	40 56	20 22	41 41	20 45	42 26	21 8	43 11	21 31	43 56	21 55	44 41	22 18
24	39 25	19 37	40 10	20 0	40 55	20 23	41 40	20 46	42 25	21 9	43 10	21 32	43 55	21 55	44 40	22 19
26	39 24	19 37	40 9	20 0	40 54	20 24	41 39	20 47	42 24	21 10	43 9	21 33	43 54	21 56	44 39	22 20
28	39 23	19 38	40 8	20 1	40 52	20 25	41 38	20 48	42 22	21 11	43 7	21 34	43 52	21 57	44 37	22 20
30	39 21	19 39	40 6	20 2	40 51	20 25	41 36	20 49	42 21	21 12	43 6	21 35	43 51	21 58	44 36	22 21
32	39 20	19 40	40 5	20 3	40 50	20 26	41 35	20 49	42 20	21 13	43 5	21 36	43 50	21 59	44 35	22 22
34	39 19	19 41	40 4	20 4	40 49	20 27	41 34	20 50	42 19	21 13	43 4	21 37	43 48	22 0	44 33	22 23
36	39 18	19 41	40 3	20 5	40 48	20 28	41 33	20 51	42 17	21 14	43 2	21 38	43 47	22 1	44 32	22 24
38	39 17	19 42	40 2	20 5	40 47	20 29	41 31	20 52	42 16	21 15	43 1	21 38	43 46	22 2	44 31	22 25
40	39 16	19 43	40 0	20 6	40 45	20 29	41 30	20 53	42 15	21 16	43 0	21 39	43 45	22 2	44 29	22 26
42	39 14	19 44	39 59	20 7	40 44	20 30	41 29	20 54	42 14	21 17	42 58	21 40	43 43	22 3	44 28	22 27
44	39 13	19 45	39 58	20 8	40 43	20 31	41 28	20 54	42 12	21 18	42 57	21 41	43 42	22 4	44 27	22 28
46	39 12	19 45	39 57	20 9	40 42	20 32	41 26	20 55	42 11	21 19	42 56	21 42	43 41	22 5	44 25	22 29
48	39 11	19 46	39 56	20 9	40 40	20 33	41 25	20 56	42 10	21 19	42 55	21 43	43 39	22 6	44 24	22 30
50	39 10	19 47	39 54	20 10	40 39	20 34	41 24	20 57	42 9	21 20	42 53	21 44	43 38	22 7	44 23	22 30
52	39 9	19 48	39 53	20 11	40 38	20 34	41 23	20 58	42 7	21 21	42 52	21 45	43 37	22 8	44 21	22 31
54	39 7	19 49	39 52	20 12	40 37	20 35	41 21	20 59	42 6	21 22	42 51	21 45	43 35	22 9	44 20	22 32
56	39 6	19 50	39 51	20 13	40 36	20 36	41 20	21 0	42 5	21 23	42 49	21 46	43 34	22 10	44 19	22 33
58	39 5	19 50	39 50	20 13	40 34	20 37	41 19	21 0	42 4	21 24	42 48	21 47	43 33	22 11	44 17	22 34

Seconds of H. P.		
″	Corr.	A
	″	″
1	1	0
2	1	1
3	2	1
4	3	1
5	4	2
6	4	2
7	5	3
8	6	3
9	7	3
10	7	4
11	8	4
12	9	5
13	10	5
14	10	5
15	11	6
16	12	6
17	13	6
18	13	7
19	14	7
20	15	8
21	16	8
22	16	8
23	17	9
24	18	9
25	19	10
26	19	10
27	20	10
28	21	11
29	22	11
30	22	11
31	23	12
32	24	12
33	25	13
34	25	13
35	26	13
36	27	14
37	28	14
38	28	15
39	29	15
40	30	15
41	31	16
42	31	16
43	32	16
44	33	17
45	34	17
46	34	18
47	35	18
48	36	18
49	37	19
50	37	19
51	38	20
52	39	20
53	40	20
54	40	21
55	41	21
56	42	21
57	43	22
58	43	22
59	44	23

App. Alt.	☉	☽	♈
°	A	A	A
3	8	8	
4	6	5	
5	4	4	
6	3	3	
7	3	2	
8	2	2	
9	2	1	
10	2	1	
20	2	0	
30	3	0	
40	3	0	
50	4	0	
60	4	0	
70	5	0	
90	5	0	

(42° and 43°) Correction of the Moon's Altitude, and the Aux. Angle A.

App. Alt.	Minutes of Moon's Hor. Parallax 54′		55′		56′		57′		58′		59′		60′		61′	
42°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. −	A 60°	Corr. +	A 60°
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
0′	39 4	19 51	39 48	20 14	40 33	20 38	41 18	21 1	42 2	21 25	42 47	21 48	43 31	22 11	44 16	22 35
2	39 3	19 52	39 47	20 15	40 32	20 39	41 16	21 2	42 1	21 25	42 46	21 49	43 30	22 12	44 15	22 36
4	39 1	19 52	39 46	20 16	40 31	20 39	41 15	21 3	42 0	21 26	42 44	21 50	43 29	22 13	44 13	22 37
6	39 0	19 53	39 45	20 17	40 29	20 40	41 14	21 4	41 58	21 27	42 43	21 51	43 27	22 14	44 12	22 38
8	38 59	19 54	39 44	20 18	40 28	20 41	41 13	21 5	41 57	21 28	42 42	21 51	43 26	22 15	44 11	22 38
10	38 58	19 55	39 42	20 18	40 27	20 42	41 11	21 5	41 56	21 29	42 40	21 52	43 25	22 16	44 9	22 39
12	38 57	19 56	39 41	20 19	40 26	20 43	41 10	21 6	41 55	21 30	42 39	21 53	43 23	22 17	44 8	22 40
14	38 55	19 56	39 40	20 20	40 24	20 43	41 9	21 7	41 53	21 31	42 38	21 54	43 22	22 18	44 7	22 41
16	38 54	19 57	39 39	20 21	40 23	20 44	41 8	21 8	41 52	21 31	42 36	21 55	43 21	22 18	44 5	22 42
18	38 53	19 58	39 38	20 22	40 22	20 45	41 6	21 9	41 51	21 32	42 35	21 56	43 19	22 19	44 4	22 43
20	38 52	19 59	39 36	20 22	40 21	20 46	41 5	21 10	41 49	21 33	42 34	21 57	43 18	22 20	44 2	22 44
22	38 51	20 0	39 35	20 23	40 19	20 47	41 4	21 10	41 48	21 34	42 32	21 57	43 17	22 21	44 1	22 45
24	38 49	20 0	39 34	20 24	40 18	20 48	41 2	21 11	41 47	21 35	42 31	21 58	43 15	22 22	44 0	22 46
26	38 48	20 1	39 33	20 25	40 17	20 48	41 1	21 12	41 45	21 36	42 30	21 59	43 14	22 23	43 58	22 46
28	38 47	20 2	39 31	20 26	40 16	20 49	41 0	21 13	41 44	21 36	42 28	22 0	43 13	22 24	43 57	22 47
30	38 46	20 3	39 30	20 26	40 14	20 50	40 59	21 14	41 43	21 37	42 27	22 1	43 11	22 25	43 56	22 48
32	38 45	20 4	39 29	20 27	40 13	20 51	40 57	21 15	41 42	21 38	42 26	22 2	43 10	22 25	43 54	22 49
34	38 43	20 4	39 28	20 28	40 12	20 52	40 56	21 15	41 40	21 39	42 24	22 3	43 9	22 26	43 53	22 50
36	38 42	20 5	39 26	20 29	40 11	20 53	40 55	21 16	41 39	21 40	42 23	22 4	43 7	22 27	43 52	22 51
38	38 41	20 6	39 25	20 30	40 9	20 54	40 54	21 17	41 38	21 41	42 22	22 4	43 6	22 28	43 50	22 52
40	38 40	20 7	39 24	20 30	40 8	20 54	40 52	21 18	41 36	21 42	42 20	22 5	43 5	22 29	43 49	22 53
42	38 39	20 8	39 23	20 31	40 7	20 55	40 51	21 19	41 35	21 42	42 19	22 6	43 3	22 30	43 47	22 54
44	38 37	20 8	39 22	20 32	40 6	20 56	40 50	21 20	41 34	21 43	42 18	22 7	43 2	22 31	43 46	22 54
46	38 36	20 9	39 20	20 33	40 4	20 57	40 49	21 20	41 33	21 44	42 17	22 8	43 1	22 32	43 45	22 55
48	38 35	20 10	39 19	20 34	40 3	20 57	40 47	21 21	41 31	21 45	42 15	22 9	42 59	22 33	43 43	22 56
50	38 34	20 11	39 18	20 35	40 2	20 58	40 46	21 22	41 30	21 46	42 14	22 10	42 58	22 33	43 42	22 57
52	38 33	20 12	39 17	20 35	40 1	20 59	40 45	21 23	41 29	21 47	42 13	22 11	42 57	22 34	43 41	22 58
54	38 31	20 12	39 16	20 36	40 0	21 0	40 44	21 24	41 28	21 48	42 12	22 11	42 56	22 35	43 39	22 59
56	38 30	20 13	39 14	20 37	39 58	21 1	40 42	21 25	41 26	21 48	42 10	22 12	42 54	22 36	43 38	23 0
58	38 29	20 14	39 13	20 38	39 57	21 2	40 41	21 25	41 25	21 49	42 9	22 13	42 53	22 37	43 37	23 1

43°	54′		55′		56′		57′		58′		59′		60′		61′	
0′	38 28	20 15	39 12	20 39	39 56	21 2	40 40	21 26	41 24	21 50	42 8	22 14	42 52	22 38	43 35	23 2
2	38 27	20 15	39 11	20 39	39 55	21 3	40 38	21 27	41 22	21 51	42 6	22 15	42 50	22 39	43 34	23 3
4	38 25	20 16	39 9	20 40	39 53	21 4	40 37	21 28	41 21	21 52	42 5	22 16	42 49	22 40	43 32	23 4
6	38 24	20 17	39 8	20 41	39 52	21 5	40 36	21 29	41 20	21 53	42 4	22 17	42 47	22 41	43 31	23 5
8	38 23	20 18	39 7	20 42	39 51	21 6	40 35	21 30	41 18	21 54	42 2	22 18	42 46	22 42	43 30	23 7
10	38 22	20 19	39 6	20 43	39 49	21 7	40 33	21 31	41 17	21 55	42 1	22 19	42 45	22 44	43 28	23 8
12	38 21	20 19	39 4	20 44	39 48	21 8	40 32	21 32	41 16	21 56	41 59	22 21	42 43	22 45	43 27	23 9
14	38 19	20 20	39 3	20 44	39 47	21 9	40 31	21 33	41 14	21 57	41 58	22 22	42 42	22 46	43 25	23 10
16	38 18	20 21	39 2	20 45	39 45	21 10	40 29	21 34	41 13	21 58	41 57	22 23	42 40	22 47	43 24	23 11
18	38 17	20 22	39 1	20 46	39 44	21 10	40 28	21 35	41 12	21 59	41 55	22 24	42 39	22 48	43 23	23 13
20	38 16	20 22	38 59	20 47	39 43	21 11	40 27	21 36	41 10	22 0	41 54	22 25	42 37	22 49	43 21	23 14
22	38 14	20 23	38 58	20 48	39 42	21 12	40 25	21 37	41 9	22 1	41 53	22 26	42 36	22 50	43 20	23 15
24	38 13	20 24	38 57	20 49	39 40	21 13	40 24	21 38	41 8	22 2	41 51	22 27	42 35	22 52	43 18	23 16
26	38 12	20 25	38 56	20 50	39 39	21 14	40 23	21 39	41 6	22 3	41 50	22 28	42 33	22 53	43 17	23 17
28	38 11	20 26	38 54	20 50	39 38	21 15	40 21	21 40	41 5	22 4	41 48	22 29	42 32	22 54	43 16	23 19
30	38 9	20 26	38 53	20 51	39 37	21 16	40 20	21 41	41 4	22 5	41 47	22 30	42 31	22 55	43 14	23 20
32	38 8	20 27	38 52	20 52	39 35	21 17	40 19	21 42	41 2	22 7	41 46	22 31	42 29	22 56	43 13	23 21
34	38 7	20 28	38 51	20 53	39 34	21 18	40 17	21 43	41 1	22 8	41 44	22 32	42 28	22 57	43 11	23 22
36	38 6	20 29	38 49	20 54	39 33	21 19	40 16	21 44	41 0	22 9	41 43	22 34	42 27	22 58	43 10	23 23
38	38 5	20 30	38 48	20 55	39 31	21 20	40 15	21 45	40 58	22 10	41 42	22 35	42 25	23 0	43 9	23 25
40	38 3	20 30	38 47	20 55	39 30	21 20	40 14	21 46	40 57	22 11	41 40	22 36	42 24	23 1	43 7	23 26
42	38 2	20 31	38 46	20 56	39 29	21 21	40 12	21 47	40 56	22 12	41 39	22 37	42 22	23 2	43 6	23 27
44	38 1	20 32	38 44	20 57	39 28	21 22	40 11	21 48	40 54	22 13	41 38	22 38	42 21	23 3	43 4	23 28
46	38 0	20 33	38 43	20 58	39 26	21 23	40 10	21 49	40 53	22 14	41 36	22 39	42 20	23 4	43 3	23 30
48	37 58	20 33	38 42	20 59	39 25	21 24	40 8	21 49	40 52	22 15	41 35	22 40	42 18	23 5	43 2	23 31
50	37 57	20 34	38 41	21 0	39 24	21 25	40 7	21 50	40 50	22 16	41 34	22 41	42 17	23 7	43 0	23 32
52	37 56	20 35	38 39	21 0	39 23	21 26	40 6	21 51	40 49	22 17	41 32	22 42	42 16	23 8	42 59	23 33
54	37 55	20 36	38 38	21 1	39 21	21 27	40 4	21 52	40 48	22 18	41 31	22 43	42 14	23 9	42 57	23 34
56	37 54	20 36	38 37	21 2	39 20	21 28	40 3	21 53	40 46	22 19	41 30	22 44	42 13	23 10	42 56	23 36
58	37 52	20 37	38 36	21 3	39 19	21 29	40 2	21 54	40 45	22 20	41 28	22 46	42 11	23 11	42 55	23 37

Seconds of H. P.		
″	Corr.	A
	″	″
1	1	0
2	1	1
3	2	1
4	3	2
5	4	2
6	4	2
7	5	3
8	6	3
9	7	4
10	7	4
11	8	4
12	9	5
13	9	5
14	10	6
15	11	6
16	12	6
17	12	7
18	13	7
19	14	8
20	15	8
21	15	8
22	16	9
23	17	9
24	18	10
25	18	10
26	19	10
27	20	11
28	20	11
29	21	12
30	22	12
31	23	12
32	23	13
33	24	13
34	25	14
35	26	14
36	26	14
37	27	15
38	28	15
39	29	16
40	29	16
41	30	16
42	31	17
43	31	17
44	32	18
45	33	18
46	34	18
47	34	19
48	35	19
49	36	20
50	37	20
51	37	20
52	38	21
53	39	21
54	40	22
55	40	22
56	41	22
57	42	23
58	42	23
59	43	24

Alt.	☉	♈ ♎ A	♋ ♑ A
°	″	″	″
3	8	8	5
4	6	5	4
5	4	4	3
6	3	3	2
7	3	2	2
8	2	2	1
9	2	1	1
10	2	1	0
20	2	0	0
30	3	0	0
40	3	0	0
50	4	0	0
60	4	0	0
70	5	0	0
90	5	0	0

Correction of the Moon's Altitude, and the Aux. Angle A. (44° and 45°)

App. Alt.	Minutes of Moon's Hor. Parallax. 54′		55′		56′		57′		58′		59′		60′		61′	
44°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
0′	37 51	20 38	38 34	21 4	39 17	21 29	40 1	21 55	40 44	22 21	41 27	22 47	42 10	23 13	42 53	23 38
2	37 50	20 39	38 33	21 5	39 16	21 30	39 59	21 56	40 42	22 22	41 26	22 47	42 9	23 13	42 52	23 39
4	37 49	20 40	38 32	21 5	39 15	21 31	39 58	21 57	40 41	22 22	41 24	22 48	42 7	23 14	42 50	23 39
6	37 47	20 40	38 30	21 6	39 14	21 32	39 57	21 57	40 40	22 23	41 23	22 48	42 6	23 14	42 49	23 40
8	37 46	20 41	38 29	21 7	39 12	21 32	39 55	21 58	40 38	22 23	41 21	22 49	42 5	23 15	42 48	23 40
10	37 45	20 42	38 28	21 7	39 11	21 33	39 54	21 59	40 37	22 24	41 20	22 50	42 3	23 15	42 46	23 41
12	37 44	20 43	38 27	21 8	39 10	21 34	39 53	21 59	40 36	22 25	41 19	22 50	42 2	23 16	42 45	23 41
14	37 42	20 43	38 25	21 9	39 8	21 34	39 51	22 0	40 34	22 25	41 17	22 51	42 0	23 16	42 43	23 42
16	37 41	20 44	38 24	21 10	39 7	21 35	39 50	22 1	40 33	22 26	41 16	22 51	41 59	23 17	42 42	23 42
18	37 40	20 45	38 23	21 11	39 6	21 36	39 49	22 1	40 32	22 27	41 15	22 52	41 58	23 17	42 41	23 43
20	37 39	20 46	38 21	21 11	39 4	21 36	39 47	22 2	40 30	22 27	41 13	22 53	41 56	23 18	42 39	23 43
22	37 37	20 47	38 20	21 12	39 3	21 37	39 46	22 3	40 29	22 28	41 12	22 53	41 55	23 18	42 38	23 44
24	37 36	20 47	38 19	21 13	39 2	21 38	39 45	22 3	40 28	22 28	41 10	22 54	41 53	23 19	42 36	23 44
26	37 35	20 48	38 18	21 13	39 1	21 39	39 43	22 4	40 26	22 29	41 9	22 54	41 52	23 20	42 35	23 45
28	37 34	20 49	38 16	21 14	38 59	21 39	39 42	22 5	40 25	22 30	41 8	22 55	41 51	23 20	42 33	23 45
30	37 32	20 50	38 15	21 15	38 58	21 40	39 41	22 5	40 24	22 30	41 6	22 56	41 49	23 21	42 32	23 46
32	37 31	20 50	38 14	21 16	38 57	21 41	39 39	22 6	40 22	22 31	41 5	22 56	41 48	23 21	42 31	23 46
34	37 30	20 51	38 13	21 16	38 55	21 41	39 38	22 7	40 21	22 32	41 4	22 57	41 46	23 22	42 29	23 47
36	37 29	20 52	38 11	21 17	38 54	21 42	39 37	22 7	40 19	22 32	41 2	22 57	41 45	23 22	42 28	23 48
38	37 27	20 53	38 10	21 18	38 53	21 43	39 36	22 8	40 18	22 33	41 1	22 58	41 44	23 23	42 26	23 48
40	37 26	20 54	38 9	21 18	38 51	21 43	39 34	22 8	40 17	22 33	40 59	22 58	41 42	23 24	42 25	23 49
42	37 25	20 54	38 8	21 19	38 50	21 44	39 33	22 9	40 15	22 34	40 58	22 59	41 41	23 24	42 23	23 49
44	37 24	20 55	38 6	21 20	38 49	21 45	39 32	22 10	40 14	22 35	40 57	23 0	41 39	23 25	42 22	23 50
46	37 22	20 56	38 5	21 21	38 48	21 46	39 30	22 11	40 13	22 35	40 55	23 0	41 38	23 25	42 21	23 50
48	37 21	20 56	38 4	21 21	38 46	21 46	39 29	22 11	40 11	22 36	40 54	23 1	41 37	23 26	42 19	23 51
50	37 20	20 57	38 2	21 22	38 45	21 47	39 28	22 12	40 10	22 37	40 53	23 2	41 35	23 26	42 18	23 51
52	37 19	20 58	38 1	21 23	38 44	21 48	39 26	22 13	40 9	22 37	40 51	23 2	41 34	23 27	42 16	23 52
54	37 17	20 59	38 0	21 24	38 42	21 48	39 25	22 13	40 7	22 38	40 50	23 3	41 32	23 28	42 15	23 52
56	37 16	21 0	37 59	21 25	38 41	21 49	39 24	22 14	40 6	22 39	40 49	23 3	41 31	23 28	42 14	23 53
58	37 15	21 0	37 57	21 25	38 40	21 50	39 22	22 15	40 5	22 39	40 47	23 4	41 30	23 29	42 12	23 53
45°	54′		55′		56′		57′		58′		59′		60′		61′	
0′	37 14	21 1	37 56	21 26	38 38	21 50	39 21	22 15	40 3	22 40	40 46	23 5	41 28	23 29	42 11	23 54
2	37 12	21 2	37 55	21 27	38 37	21 51	39 20	22 16	40 2	22 41	40 44	23 5	41 27	23 30	42 9	23 55
4	37 11	21 3	37 53	21 27	38 36	21 52	39 18	22 17	40 1	22 42	40 43	23 6	41 25	23 31	42 8	23 56
6	37 10	21 3	37 52	21 28	38 35	21 53	39 17	22 18	39 59	22 42	40 42	23 7	41 24	23 32	42 6	23 57
8	37 8	21 4	37 51	21 29	38 33	21 54	39 15	22 18	39 58	22 43	40 40	23 8	41 23	23 33	42 5	23 57
10	37 7	21 5	37 49	21 30	38 32	21 54	39 14	22 19	39 56	22 44	40 39	23 9	41 21	23 33	42 3	23 58
12	37 6	21 6	37 48	21 30	38 31	21 55	39 13	22 20	39 55	22 45	40 37	23 10	41 20	23 34	42 2	23 59
14	37 5	21 6	37 47	21 31	38 29	21 56	39 11	22 21	39 54	22 46	40 36	23 10	41 18	23 35	42 0	24 0
16	37 3	21 7	37 46	21 32	38 28	21 57	39 10	22 22	39 52	22 46	40 35	23 11	41 17	23 36	41 59	24 1
18	37 2	21 8	37 44	21 33	38 27	21 58	39 9	22 22	39 51	22 47	40 33	23 12	41 15	23 37	41 58	24 2
20	37 1	21 9	37 43	21 33	38 25	21 58	39 7	22 23	39 49	22 48	40 32	23 13	41 14	23 38	41 56	24 3
22	37 0	21 9	37 42	21 34	38 24	21 59	39 6	22 24	39 48	22 49	40 30	23 14	41 12	23 39	41 55	24 3
24	36 58	21 10	37 40	21 35	38 23	22 0	39 5	22 25	39 47	22 50	40 29	23 15	41 11	23 39	41 53	24 4
26	36 57	21 11	37 39	21 36	38 21	22 1	39 3	22 26	39 45	22 50	40 27	23 15	41 10	23 40	41 52	24 5
28	36 56	21 12	37 38	21 37	38 20	22 1	39 2	22 26	39 44	22 51	40 26	23 16	41 8	23 41	41 50	24 6
30	36 54	21 12	37 36	21 37	38 19	22 2	39 1	22 27	39 43	22 52	40 25	23 17	41 7	23 42	41 49	24 7
32	36 53	21 13	37 35	21 38	38 17	22 3	38 59	22 28	39 41	22 53	40 23	23 18	41 5	23 43	41 47	24 8
34	36 52	21 14	37 34	21 39	38 16	22 4	38 58	22 29	39 40	22 54	40 22	23 19	41 4	23 44	41 46	24 9
36	36 51	21 15	37 33	21 40	38 15	22 5	38 57	22 30	39 39	22 54	40 20	23 19	41 2	23 44	41 44	24 9
38	36 49	21 16	37 31	21 40	38 13	22 6	38 55	22 30	39 37	22 55	40 19	23 20	41 1	23 45	41 43	24 10
40	36 48	21 16	37 30	21 41	38 12	22 6	38 54	22 31	39 36	22 56	40 18	23 21	41 0	23 46	41 42	24 11
42	36 47	21 17	37 29	21 42	38 11	22 7	38 52	22 32	39 34	22 57	40 16	23 22	40 58	23 47	41 40	24 12
44	36 45	21 18	37 27	21 43	38 9	22 8	38 51	22 33	39 33	22 58	40 15	23 23	40 57	23 48	41 39	24 13
46	36 44	21 18	37 26	21 43	38 8	22 8	38 50	22 33	39 32	22 59	40 13	23 24	40 55	23 49	41 37	24 14
48	36 43	21 19	37 25	21 44	38 7	22 9	38 48	22 34	39 30	22 59	40 12	23 24	40 54	23 49	41 36	24 15
50	36 42	21 20	37 23	21 45	38 5	22 10	38 47	22 35	39 29	23 0	40 11	23 25	40 52	23 50	41 34	24 15
52	36 40	21 21	37 22	21 45	38 4	22 11	38 46	22 36	39 28	23 1	40 9	23 26	40 51	23 51	41 33	24 16
54	36 39	21 21	37 21	21 46	38 3	22 12	38 44	22 37	39 26	23 2	40 8	23 27	40 50	23 52	41 31	24 17
56	36 38	21 22	37 20	21 47	38 1	22 12	38 43	22 37	39 25	23 3	40 6	23 28	40 48	23 53	41 30	24 18
58	36 36	21 23	37 18	21 48	38 0	22 13	38 42	22 38	39 23	23 3	40 5	23 29	40 47	23 54	41 29	24 19

Seconds of H. P.		
″	Corr.	A
	″	″
1	1	0
2	1	1
3	2	1
4	3	2
5	4	2
6	4	2
7	5	3
8	6	3
9	6	4
10	7	4
11	8	5
12	8	5
13	9	5
14	10	6
15	11	6
16	11	7
17	12	7
18	13	7
19	13	8
20	14	8
21	15	9
22	15	9
23	16	10
24	17	10
25	18	10
26	18	11
27	19	11
28	20	12
29	20	12
30	21	13
31	22	13
32	23	13
33	23	14
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36	25	15
37	26	15
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40	28	17
41	29	17
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46	33	19
47	33	20
48	34	20
49	35	20
50	35	21
51	36	21
52	37	22
53	37	22
54	38	22
55	39	23
56	40	23
57	40	24
58	41	24
59	42	25

Alt.	☉	☾
	A	A
°	″	″
3	8	8
4	6	5
5	4	4
6	3	3
7	3	2
8	2	2
9	2	1
10	2	1
20	2	0
30	3	0
40	3	0
50	4	0
60	4	0
70	5	0
90	5	0

(46° and 47°) Correction of the Moon's Altitude, and the Aux. Angle A.

App. Alt.	Minutes of Moon's Hor. Parallax. 54′		55′		56′		57′		58′		59′		60′		61′	
46°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. −	A 60°	Corr. −	A 60°
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
0′	36 35	21 24	37 17	21 49	37 59	22 14	38 40	22 39	39 22	23 4	40 4	23 29	40 45	23 55	41 27	24 20
2	36 34	21 24	37 16	21 50	37 57	22 15	38 39	22 40	39 21	23 5	40 2	23 30	40 44	23 55	41 26	24 21
4	36 33	21 25	37 14	21 50	37 56	22 16	38 38	22 41	39 19	23 6	40 1	23 31	40 42	23 56	41 24	24 21
6	36 31	21 26	37 13	21 51	37 55	22 16	38 36	22 41	39 18	23 7	39 59	23 32	40 41	23 57	41 23	24 22
8	36 30	21 27	37 12	21 52	37 53	22 17	38 35	22 42	39 16	23 7	39 58	23 33	40 40	23 58	41 21	24 23
10	36 28	21 27	37 10	21 53	37 52	22 18	38 33	22 43	39 15	23 8	39 57	23 33	40 38	23 59	41 20	24 24
12	36 27	21 28	37 9	21 53	37 51	22 19	38 32	22 44	39 14	23 9	39 55	23 34	40 37	24 0	41 18	24 25
14	36 26	21 29	37 8	21 54	37 49	22 19	38 31	22 45	39 12	23 10	39 54	23 35	40 35	24 0	41 17	24 26
16	36 25	21 30	37 6	21 55	37 48	22 20	38 29	22 45	39 11	23 11	39 52	23 36	40 34	24 1	41 15	24 26
18	36 23	21 30	37 5	21 56	37 46	22 21	38 28	22 46	39 9	23 11	39 51	23 37	40 32	24 2	41 14	24 27
20	36 22	21 31	37 4	21 56	37 45	22 22	38 26	22 47	39 8	23 12	39 49	23 37	40 31	24 3	41 12	24 28
22	36 21	21 32	37 2	21 57	37 44	22 22	38 25	22 48	39 7	23 13	39 48	23 38	40 29	24 4	41 11	24 29
24	36 20	21 33	37 1	21 58	37 42	22 23	38 24	22 48	39 5	23 14	39 47	23 39	40 28	24 4	41 9	24 30
26	36 18	21 33	37 0	21 58	37 41	22 24	38 22	22 49	39 4	23 15	39 45	23 40	40 26	24 5	41 8	24 30
28	36 17	21 34	36 58	21 59	37 40	22 25	38 21	22 50	39 2	23 15	39 44	23 41	40 25	24 6	41 6	24 31
30	36 16	21 35	36 57	22 0	37 38	22 25	38 20	22 51	39 0	23 16	39 42	23 41	40 23	24 7	41 5	24 32
32	36 14	21 36	36 56	22 0	37 37	22 26	38 18	22 52	38 59	23 17	39 41	23 42	40 22	24 8	41 3	24 33
34	36 13	21 36	36 54	22 1	37 36	22 27	38 17	22 52	38 58	23 18	39 39	23 43	40 21	24 8	41 2	24 34
36	36 12	21 37	36 53	22 2	37 34	22 28	38 15	22 53	38 57	23 18	39 38	23 44	40 19	24 9	41 0	24 35
38	36 10	21 38	36 52	22 2	37 33	22 29	38 14	22 54	38 55	23 19	39 36	23 45	40 18	24 10	40 59	24 35
40	36 9	21 38	36 50	22 4	37 31	22 29	38 13	22 55	38 54	23 20	39 35	23 45	40 16	24 11	40 57	24 36
42	36 8	21 39	36 49	22 5	37 30	22 30	38 11	22 55	38 52	23 21	39 34	23 46	40 15	24 12	40 56	24 37
44	36 6	21 40	36 48	22 5	37 29	22 31	38 10	22 56	38 51	23 22	39 32	23 47	40 13	24 12	40 54	24 38
46	36 5	21 41	36 46	22 6	37 27	22 32	38 9	22 57	38 50	23 22	39 31	23 48	40 12	24 13	40 53	24 39
48	36 4	21 41	36 45	22 7	37 26	22 32	38 7	22 58	38 48	23 23	39 29	23 49	40 10	24 14	40 51	24 40
50	36 3	21 42	36 44	22 8	37 25	22 33	38 6	22 59	38 47	23 24	39 28	23 49	40 9	24 15	40 50	24 40
52	36 1	21 43	36 42	22 8	37 23	22 34	38 4	22 59	38 45	23 25	39 26	23 50	40 7	24 16	40 49	24 41
54	36 0	21 44	36 41	22 9	37 22	22 35	38 3	23 0	38 44	23 26	39 25	23 51	40 6	24 17	40 47	24 42
56	35 59	21 44	36 40	22 10	37 21	22 35	38 2	23 1	38 43	23 26	39 24	23 52	40 5	24 17	40 46	24 43
58	35 57	21 45	36 38	22 11	37 19	22 36	38 0	23 2	38 41	23 27	39 22	23 53	40 3	24 18	40 44	24 44
47°	54′		55′		56′		57′		58′		59′		60′		61′	
0′	35 56	21 46	36 37	22 11	37 18	22 37	37 59	23 2	38 40	23 28	39 21	23 53	40 2	24 19	40 43	24 44
2	35 55	21 47	36 36	22 12	37 17	22 38	37 57	23 3	38 38	23 29	39 19	23 54	40 0	24 20	40 41	24 45
4	35 53	21 47	36 34	22 13	37 15	22 38	37 56	23 4	38 37	23 29	39 18	23 55	39 59	24 21	40 40	24 46
6	35 52	21 48	36 33	22 14	37 14	22 39	37 55	23 5	38 36	23 30	39 16	23 56	39 57	24 21	40 38	24 47
8	35 51	21 49	36 32	22 14	37 12	22 40	37 53	23 6	38 34	23 31	39 15	23 57	39 56	24 22	40 37	24 48
10	35 49	21 49	36 30	22 15	37 11	22 41	37 52	23 6	38 33	23 32	39 13	23 58	39 54	24 23	40 35	24 49
12	35 48	21 50	36 29	22 16	37 10	22 41	37 50	23 7	38 31	23 33	39 12	23 58	39 53	24 24	40 34	24 50
14	35 47	21 51	36 28	22 17	37 8	22 42	37 49	23 8	38 30	23 33	39 11	23 59	39 51	24 25	40 32	24 50
16	35 45	21 52	36 26	22 17	37 7	22 43	37 48	23 9	38 28	23 34	39 9	24 0	39 50	24 26	40 31	24 51
18	35 44	21 52	36 25	22 18	37 5	22 44	37 46	23 9	38 27	23 35	39 8	24 1	39 48	24 27	40 29	24 52
20	35 43	21 53	36 23	22 19	37 4	22 44	37 45	23 10	38 25	23 36	39 6	24 2	39 47	24 27	40 27	24 53
22	35 41	21 54	36 22	22 20	37 2	22 45	37 43	23 11	38 24	23 37	39 5	24 2	39 45	24 28	40 26	24 54
24	35 40	21 55	36 21	22 20	37 1	22 46	37 42	23 12	38 23	23 37	39 3	24 3	39 44	24 29	40 24	24 55
26	35 39	21 55	36 19	22 21	37 0	22 47	37 41	23 12	38 21	23 38	39 2	24 4	39 42	24 30	40 23	24 55
28	35 37	21 56	36 18	22 22	36 59	22 47	37 39	23 13	38 20	23 39	39 0	24 5	39 41	24 30	40 21	24 56
30	35 36	21 57	36 17	22 22	36 57	22 48	37 38	23 14	38 18	23 40	38 59	24 5	39 39	24 31	40 20	24 57
32	35 35	21 57	36 15	22 23	36 56	22 49	37 36	23 15	38 17	23 40	38 57	24 6	39 38	24 32	40 18	24 58
34	35 33	21 58	36 14	22 24	36 55	22 50	37 35	23 15	38 15	23 41	38 56	24 7	39 37	24 33	40 17	24 58
36	35 32	21 59	36 13	22 25	36 53	22 50	37 34	23 16	38 14	23 42	38 55	24 8	39 35	24 33	40 15	24 59
38	35 31	22 0	36 11	22 25	36 52	22 51	37 32	23 17	38 13	23 43	38 53	24 9	39 34	24 34	40 14	25 0
40	35 29	22 0	36 10	22 26	36 50	22 52	37 31	23 18	38 11	23 43	38 52	24 9	39 32	24 35	40 12	25 1
42	35 28	22 1	36 9	22 27	36 49	22 53	37 29	23 18	38 10	23 44	38 50	24 10	39 31	24 36	40 11	25 2
44	35 27	22 2	36 7	22 28	36 48	22 53	37 28	23 19	38 8	23 45	38 49	24 11	39 29	24 37	40 9	25 2
46	35 26	22 3	36 6	22 28	36 46	22 54	37 27	23 20	38 7	23 46	38 47	24 12	39 28	24 37	40 8	25 3
48	35 24	22 3	36 5	22 29	36 45	22 55	37 25	23 21	38 5	23 47	38 46	24 12	39 26	24 38	40 6	25 4
50	35 23	22 4	36 3	22 30	36 43	22 56	37 24	23 21	38 4	23 47	38 44	24 13	39 25	24 39	40 5	25 5
52	35 22	22 5	36 2	22 31	36 42	22 56	37 22	23 22	38 3	23 48	38 43	24 14	39 23	24 40	40 3	25 6
54	35 20	22 5	36 0	22 31	36 41	22 57	37 21	23 23	38 1	23 49	38 41	24 15	39 22	24 41	40 2	25 7
56	35 19	22 6	35 59	22 32	36 39	22 58	37 20	23 24	38 0	23 50	38 40	24 16	39 20	24 41	40 0	25 7
58	35 18	22 7	35 58	22 33	36 38	22 59	37 18	23 25	37 58	23 50	38 39	24 16	39 19	24 42	39 59	25 8

Seconds of H. P.		
″	Cor	A
	″	″
1	1	0
2	1	1
3	2	1
4	3	2
5	3	2
6	4	3
7	5	3
8	5	3
9	6	4
10	7	4
11	7	5
12	8	5
13	9	6
14	10	6
15	10	6
16	11	7
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19	13	8
20	14	9
21	15	9
22	15	9
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27	19	11
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29	20	12
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37	25	16
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40	27	17
41	28	17
42	29	18
43	29	18
44	30	19
45	31	19
46	31	20
47	32	20
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49	33	21
50	34	21
51	35	22
52	35	22
53	36	23
54	37	23
55	38	23
56	38	24
57	39	24
58	40	25
59	40	25
Alt.	☉	☽
″	A	A
	°	°
0	8	8
1	6	5
2	4	4
3	3	3
4	2	2
5	2	2
6	2	1
7	1	1
8	1	0
9	0	0
10	0	0
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
17	0	0
18	0	0
19	0	0
20	0	0
21	0	0
22	0	0
23	0	0
24	0	0
25	0	0
26	0	0
27	0	0
28	0	0
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37	0	0
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41	0	0
42	0	0
43	0	0
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46	0	0
47	0	0
48	0	0
49	0	0
50	0	0
51	0	0
52	0	0
53	0	0
54	0	0
55	0	0
56	0	0
57	0	0
58	0	0
59	0	0
60	0	0

Correction of the Moon's Altitude, and the Aux. Angle A. (48° and 49°)

App. Alt.	Minutes of Moon's Hor. Parallax. 54′		55′		56′		57′		58′		59′		60′		61′	
48°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
0′	35 16	22 8	35 56	22 33	36 37	22 59	37 17	23 25	37 57	23 51	38 37	24 17	39 17	24 43	39 57	25 9
2	35 15	22 8	35 55	22 34	36 35	23 0	37 15	23 26	37 56	23 52	38 36	24 18	39 16	24 44	39 56	25 10
4	35 13	22 9	35 54	22 35	36 34	23 1	37 14	23 27	37 54	23 53	38 34	24 19	39 14	24 45	39 54	25 11
6	35 12	22 10	35 52	22 36	36 32	23 2	37 12	23 28	37 53	23 54	38 33	24 19	39 13	24 45	39 53	25 11
8	35 11	22 10	35 51	22 36	36 31	23 2	37 11	23 28	37 51	23 54	38 31	24 20	39 11	24 46	39 51	25 12
10	35 9	22 11	35 49	22 37	36 30	23 3	37 10	23 29	37 50	23 55	38 30	24 21	39 10	24 47	39 50	25 13
12	35 8	22 12	35 48	22 38	36 28	23 4	37 8	23 30	37 48	23 56	38 28	24 22	39 8	24 48	39 48	25 14
14	35 7	22 13	35 47	22 39	36 27	23 5	37 7	23 31	37 47	23 57	38 27	24 23	39 7	24 49	39 47	25 15
16	35 5	22 13	35 45	22 39	36 25	23 5	37 5	23 31	37 45	23 57	38 25	24 23	39 5	24 50	39 45	25 16
18	35 4	22 14	35 44	22 40	36 24	23 6	37 4	23 32	37 44	23 58	38 24	24 24	39 4	24 50	39 44	25 16
20	35 3	22 15	35 43	22 41	36 22	23 7	37 2	23 33	37 42	23 59	38 22	24 25	39 2	24 51	39 42	25 17
22	35 1	22 15	35 41	22 42	36 21	23 8	37 1	23 34	37 41	24 0	38 21	24 26	39 0	24 52	39 40	25 18
24	35 0	22 16	35 40	22 42	36 20	23 8	37 0	23 34	37 39	24 0	38 19	24 27	38 59	24 53	39 39	25 19
26	34 59	22 17	35 38	22 43	36 18	23 9	36 58	23 35	37 38	24 1	38 18	24 27	38 58	24 54	39 37	25 20
28	34 57	22 17	35 37	22 44	36 17	23 10	36 57	23 36	37 36	24 2	38 16	24 28	38 56	24 54	39 36	25 20
30	34 56	22 18	35 36	22 44	36 15	23 10	36 55	23 37	37 35	24 3	38 15	24 29	38 55	24 55	39 34	25 21
32	34 55	22 19	35 34	22 45	36 14	23 11	36 54	23 37	37 34	24 3	38 13	24 30	38 53	24 56	39 33	25 22
34	34 53	22 20	35 33	22 46	36 13	23 12	36 52	23 38	37 32	24 4	38 12	24 30	38 52	24 57	39 31	25 23
36	34 52	22 20	35 32	22 46	36 11	23 13	36 51	23 39	37 31	24 5	38 10	24 31	38 50	24 57	39 30	25 24
38	34 51	22 21	35 30	22 47	36 10	23 13	36 50	23 40	37 29	24 6	38 9	24 32	38 49	24 58	39 28	25 24
40	34 49	22 22	35 29	22 48	36 8	23 14	36 48	23 40	37 28	24 6	38 7	24 33	38 47	24 59	39 27	25 25
42	34 48	22 22	35 27	22 49	36 7	23 15	36 47	23 41	37 26	24 7	38 6	24 33	38 46	25 0	39 25	25 26
44	34 46	22 23	35 26	22 49	36 6	23 16	36 45	23 42	37 25	24 8	38 4	24 34	38 44	25 0	39 23	25 27
46	34 45	22 24	35 25	22 50	36 4	23 16	36 44	23 43	37 23	24 9	38 3	24 35	38 43	25 1	39 21	25 27
48	34 44	22 25	35 23	22 51	36 3	23 17	36 42	23 43	37 22	24 10	38 2	24 36	38 41	25 2	39 20	25 28
50	34 42	22 25	35 22	22 51	36 1	23 18	36 41	23 44	37 21	24 10	38 0	24 37	38 40	25 3	39 19	25 29
52	34 41	22 26	35 21	22 52	36 0	23 19	36 40	23 45	37 19	24 11	37 59	24 37	38 38	25 4	39 17	25 30
54	34 40	22 27	35 19	22 53	35 59	23 19	36 38	23 46	37 18	24 12	37 57	24 38	38 37	25 4	39 16	25 31
56	34 38	22 27	35 18	22 54	35 57	23 20	36 37	23 46	37 16	24 13	37 56	24 39	38 35	25 5	39 14	25 31
58	34 37	22 28	35 16	22 55	35 56	23 21	36 35	23 47	37 15	24 13	37 54	24 40	38 34	25 6	39 13	25 32
49°	54′		55′		56′		57′		58′		59′		60′		61′	
0′	34 36	22 29	35 15	22 55	35 54	23 21	36 34	23 48	37 13	24 14	37 53	24 40	38 32	25 7	39 11	25 33
2	34 34	22 29	35 14	22 56	35 53	23 22	36 32	23 49	37 12	24 15	37 51	24 41	38 31	25 8	39 10	25 34
4	34 33	22 30	35 12	22 57	35 52	23 23	36 31	23 49	37 10	24 16	37 50	24 42	38 29	25 8	39 8	25 35
6	34 32	22 31	35 11	22 57	35 50	23 24	36 30	23 50	37 9	24 16	37 48	24 43	38 27	25 9	39 7	25 35
8	34 30	22 32	35 9	22 58	35 49	23 24	36 28	23 51	37 7	24 17	37 47	24 43	38 26	25 10	39 5	25 36
10	34 29	22 32	35 8	22 59	35 47	23 25	36 27	23 51	37 6	24 18	37 45	24 44	38 24	25 11	39 4	25 37
12	34 27	22 33	35 7	22 59	35 46	23 26	36 25	23 52	37 4	24 19	37 44	24 45	38 23	25 11	39 2	25 38
14	34 26	22 34	35 5	23 0	35 44	23 27	36 24	23 53	37 3	24 19	37 42	24 46	38 21	25 12	39 0	25 39
16	34 25	22 34	35 4	23 1	35 43	23 27	36 22	23 54	37 1	24 20	37 41	24 46	38 20	25 13	38 59	25 39
18	34 23	22 35	35 2	23 1	35 42	23 28	36 21	23 54	37 0	24 21	37 39	24 47	38 18	25 14	38 57	25 40
20	34 22	22 36	35 1	23 2	35 40	23 29	36 19	23 55	36 58	24 22	37 37	24 48	38 17	25 14	38 56	25 41
22	34 21	22 36	35 0	23 3	35 39	23 29	36 18	23 56	36 57	24 22	37 36	24 49	38 15	25 15	38 54	25 42
24	34 19	22 37	34 58	23 4	35 37	23 30	36 16	23 57	36 55	24 23	37 34	24 50	38 14	25 16	38 53	25 42
26	34 18	22 38	34 57	23 4	35 36	23 31	36 15	23 57	36 54	24 24	37 33	24 50	38 12	25 17	38 51	25 43
28	34 16	22 39	34 55	23 5	35 34	23 32	36 13	23 58	36 52	24 25	37 31	24 51	38 10	25 18	38 50	25 44
30	34 15	22 39	34 54	23 6	35 33	23 32	36 12	23 59	36 51	24 25	37 30	24 52	38 9	25 18	38 48	25 45
32	34 14	22 40	34 53	23 7	35 32	23 33	36 11	24 0	36 49	24 26	37 28	24 53	38 7	25 19	38 46	25 46
34	34 12	22 41	34 51	23 7	35 30	23 34	36 9	24 0	36 48	24 27	37 27	24 53	38 6	25 20	38 45	25 46
36	34 11	22 41	34 50	23 8	35 29	23 34	36 8	24 1	36 46	24 28	37 25	24 54	38 4	25 21	38 43	25 47
38	34 9	22 42	34 48	23 9	35 27	23 35	36 6	24 2	36 45	24 28	37 24	24 55	38 3	25 21	38 42	25 48
40	34 8	22 43	34 47	23 9	35 26	23 36	36 4	24 2	36 43	24 29	37 22	24 56	38 1	25 22	38 40	25 49
42	34 7	22 43	34 46	23 10	35 24	23 37	36 3	24 3	36 42	24 30	37 21	24 56	38 0	25 23	38 39	25 50
44	34 5	22 44	34 44	23 11	35 23	23 37	36 2	24 4	36 41	24 31	37 19	24 57	37 58	25 24	38 37	25 50
46	34 4	22 45	34 43	23 12	35 22	23 38	36 0	24 5	36 39	24 31	37 18	24 58	37 57	25 25	38 35	25 51
48	34 3	22 46	34 41	23 12	35 20	23 39	35 59	24 5	36 38	24 32	37 16	24 59	37 55	25 25	38 34	25 52
50	34 1	22 46	34 40	23 13	35 19	23 40	35 57	24 6	36 36	24 33	37 15	24 59	37 54	25 26	38 32	25 53
52	34 0	22 47	34 39	23 14	35 17	23 40	35 56	24 7	36 35	24 34	37 13	25 0	37 52	25 27	38 31	25 53
54	33 59	22 48	34 37	23 14	35 16	23 41	35 55	24 8	36 33	24 34	37 12	25 1	37 50	25 28	38 29	25 54
56	33 57	22 48	34 36	23 15	35 14	23 42	35 53	24 8	36 32	24 35	37 10	25 2	37 49	25 28	38 28	25 55
58	33 56	22 49	34 34	23 16	35 13	23 42	35 52	24 9	36 30	24 36	37 9	25 2	37 47	25 29	38 26	25 56

Seconds of H. P.		
″	Cor.	A
	″	″
1	1	0
2	1	1
3	2	1
4	3	2
5	3	2
6	4	3
7	5	3
8	5	4
9	6	4
10	7	4
11	7	5
12	8	5
13	9	6
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53	35	23
54	36	24
55	36	24
56	37	25
57	38	25
58	38	26
59	39	26
° Alt.	☉	✱
	A	A
3	8	8
4	6	5
5	4	4
6	3	3
7	3	2
8	2	2
9	2	1
10	2	1
20	2	0
30	3	0
40	3	0
50	4	0
60	4	0
70	5	0
90	5	0

(50° and 51°) Correction of the Moon's Altitude, and the Aux. Angle A.

App. Alt.	Minutes of Moon's Hor. Parallax. 54		55′		56′		57′		58′		59′		60′		61′	
50°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
0′	33 54	22 50	34 33	23 16	35 12	23 43	35 50	24 10	36 29	24 36	37 7	25 3	37 46	25 30	38 24	25 57
2	33 53	22 50	34 32	23 17	35 10	23 44	35 49	24 11	36 27	24 37	37 6	25 4	37 44	25 31	38 23	25 57
4	33 52	22 51	34 30	23 18	35 9	23 45	35 47	24 11	36 26	24 38	37 4	25 5	37 43	25 31	38 21	25 58
6	33 50	22 52	34 29	23 19	35 7	23 45	35 46	24 12	36 24	24 39	37 3	25 5	37 41	25 32	38 20	25 59
8	33 49	22 53	34 27	23 19	35 6	23 46	35 44	24 13	36 23	24 39	37 1	25 6	37 40	25 33	38 18	26 0
10	33 47	22 53	34 26	23 20	35 4	23 47	35 43	24 13	36 21	24 40	37 0	25 7	37 38	25 34	38 17	26 0
12	33 46	22 54	34 24	23 21	35 3	23 47	35 41	24 14	36 20	24 41	36 58	25 8	37 36	25 34	38 15	26 1
14	33 45	22 55	34 23	23 21	35 1	23 48	35 40	24 15	36 18	24 42	36 57	25 8	37 35	25 35	38 13	26 2
16	33 43	22 55	34 22	23 22	35 0	23 49	35 38	24 16	36 17	24 42	36 55	25 9	37 33	25 36	38 12	26 3
18	33 42	22 56	34 20	23 23	34 58	23 49	35 37	24 16	36 15	24 43	36 53	25 10	37 32	25 37	38 10	26 4
20	33 40	22 57	34 19	23 23	34 57	23 50	35 35	24 17	36 14	24 44	36 52	25 11	37 30	25 37	38 9	26 4
22	33 39	22 57	34 17	23 24	34 56	23 51	35 34	24 18	36 12	24 45	36 50	25 11	37 29	25 38	38 7	26 5
24	33 38	22 58	34 16	23 25	34 54	23 52	35 32	24 18	36 11	24 45	36 49	25 12	37 27	25 39	38 5	26 6
26	33 36	22 59	34 14	23 25	34 53	23 52	35 31	24 19	36 9	24 46	36 47	25 13	37 26	25 40	38 4	26 7
28	33 35	22 59	34 13	23 26	34 51	23 53	35 29	24 20	36 8	24 47	36 46	25 14	37 24	25 40	38 2	26 7
30	33 33	23 0	34 12	23 27	34 50	23 54	35 28	24 21	36 6	24 47	36 44	25 14	37 22	25 41	38 1	26 8
32	33 32	23 1	34 10	23 28	34 48	23 54	35 26	24 21	36 5	24 48	36 43	25 15	37 21	25 42	37 59	26 9
34	33 31	23 1	34 9	23 28	34 47	23 55	35 25	24 22	36 3	24 49	36 41	25 16	37 19	25 43	37 58	26 10
36	33 29	23 2	34 7	23 29	34 45	23 56	35 24	24 23	36 2	24 50	36 40	25 17	37 18	25 43	37 56	26 10
38	33 28	23 3	34 6	23 30	34 44	23 57	35 22	24 23	36 0	24 50	36 38	25 17	37 16	25 44	37 54	26 11
40	33 26	23 3	34 4	23 30	34 43	23 57	35 21	24 24	35 59	24 51	36 37	25 18	37 15	25 45	37 53	26 12
42	33 25	23 4	34 3	23 31	34 41	23 58	35 19	24 25	35 57	24 52	36 35	25 19	37 13	25 46	37 51	26 13
44	33 24	23 5	34 2	23 32	34 40	23 59	35 18	24 26	35 56	24 53	36 34	25 19	37 12	25 46	37 50	26 13
46	33 22	23 6	34 0	23 32	34 38	23 59	35 16	24 26	35 54	24 53	36 32	25 20	37 10	25 47	37 48	26 14
48	33 21	23 6	33 59	23 33	34 37	24 0	35 15	24 27	35 53	24 54	36 31	25 21	37 9	25 48	37 46	26 15
50	33 19	23 7	33 57	23 34	34 35	24 1	35 13	24 28	35 51	24 55	36 29	25 22	37 7	25 49	37 45	26 16
52	33 18	23 8	33 56	23 35	34 34	24 2	35 12	24 29	35 50	24 56	36 28	25 22	37 5	25 50	37 43	26 17
54	33 17	23 8	33 55	23 35	34 32	24 2	35 10	24 29	35 48	24 56	36 26	25 23	37 4	25 50	37 42	26 17
56	33 15	23 9	33 53	23 36	34 31	24 3	35 9	24 30	35 47	24 57	36 24	25 24	37 2	25 51	37 40	26 18
58	33 14	23 10	33 52	23 37	34 29	24 4	35 7	24 31	35 45	24 58	36 23	25 25	37 1	25 52	37 38	26 19
51°	54′		55′		56′		57′		58′		59′		60′		61′	
0′	33 12	23 10	33 50	23 37	34 28	24 4	35 6	24 31	35 44	24 58	36 21	25 25	36 59	25 53	37 37	26 20
2	33 11	23 11	33 49	23 38	34 27	24 5	35 4	24 32	35 42	24 59	36 20	25 26	36 58	25 53	37 35	26 20
4	33 10	23 12	33 47	23 39	34 25	24 6	35 3	24 33	35 41	25 0	36 18	25 27	36 56	25 54	37 34	26 21
6	33 8	23 12	33 46	23 39	34 24	24 6	35 1	24 34	35 39	25 1	36 17	25 28	36 54	25 55	37 32	26 22
8	33 7	23 13	33 44	23 40	34 22	24 7	35 0	24 34	35 37	25 1	36 15	25 28	36 53	25 56	37 30	26 23
10	33 5	23 14	33 43	23 41	34 21	24 8	34 58	24 35	35 36	25 2	36 14	25 29	36 51	25 56	37 29	26 23
12	33 4	23 14	33 42	23 41	34 19	24 9	34 57	24 36	35 34	25 3	36 12	25 30	36 50	25 57	37 27	26 24
14	33 3	23 15	33 40	23 42	34 18	24 9	34 55	24 36	35 33	25 4	36 10	25 31	36 48	25 58	37 26	26 25
16	33 1	23 16	33 39	23 43	34 16	24 10	34 54	24 37	35 31	25 4	36 9	25 31	36 46	25 59	37 24	26 26
18	33 0	23 16	33 37	23 44	34 15	24 11	34 52	24 38	35 30	25 5	36 7	25 32	36 45	25 59	37 22	26 26
20	32 58	23 17	33 36	23 44	34 13	24 11	34 51	24 38	35 28	25 6	36 6	25 33	36 43	26 0	37 21	26 27
22	32 57	23 18	33 34	23 45	34 12	24 12	34 49	24 39	35 27	25 6	36 4	25 34	36 42	26 1	37 19	26 28
24	32 55	23 18	33 33	23 46	34 10	24 13	34 48	24 40	35 25	25 7	36 3	25 34	36 40	26 1	37 18	26 29
26	32 54	23 19	33 31	23 46	34 9	24 13	34 46	24 41	35 24	25 8	36 1	25 35	36 39	26 2	37 16	26 29
28	32 53	23 20	33 30	23 47	34 7	24 14	34 45	24 41	35 22	25 9	36 0	25 36	36 37	26 3	37 14	26 30
30	32 51	23 20	33 29	25 48	34 6	24 15	34 43	24 42	35 21	25 9	35 58	25 36	36 35	26 4	37 13	26 31
32	32 50	23 21	33 27	23 48	34 4	24 15	34 42	24 43	35 19	25 10	35 56	25 37	36 34	26 4	37 11	26 32
34	32 48	23 22	33 26	23 49	34 3	24 16	34 40	24 43	35 18	25 11	35 55	25 38	36 32	26 5	37 10	26 32
36	32 47	23 22	33 24	23 50	34 2	24 17	34 39	24 44	35 16	25 11	35 53	25 39	36 31	26 6	37 8	26 33
38	32 46	23 23	33 23	23 50	34 0	24 18	34 37	24 45	35 15	25 12	35 52	25 39	36 29	26 7	37 6	26 34
40	32 44	23 24	33 21	23 51	33 59	24 18	34 36	24 45	35 13	25 13	35 50	25 40	36 27	26 7	37 5	26 35
42	32 43	23 24	33 20	23 52	33 57	24 19	34 34	24 46	35 11	25 14	35 49	25 41	36 26	26 8	37 3	26 35
44	32 41	23 25	33 18	23 52	33 56	24 20	34 33	24 47	35 10	25 14	35 47	25 42	36 24	26 9	37 1	26 36
46	32 40	23 26	33 17	23 53	33 54	24 20	34 31	24 48	35 8	25 15	35 46	25 42	36 23	26 10	37 0	26 37
48	32 38	23 26	33 16	23 54	33 53	24 21	34 30	24 48	35 7	25 16	35 44	25 43	36 21	26 10	36 58	26 38
50	32 37	23 27	33 14	23 54	33 51	24 22	34 28	24 49	35 5	25 16	35 42	25 44	36 20	26 11	36 57	26 38
52	32 36	23 28	33 13	23 55	33 50	24 22	34 27	24 50	35 4	25 17	35 41	25 44	36 18	26 12	36 55	26 39
54	32 34	23 29	33 11	23 56	33 48	24 23	34 25	24 50	35 2	25 18	35 39	25 45	36 16	26 13	36 53	26 40
56	32 33	23 29	33 10	23 56	33 47	24 24	34 24	24 51	35 1	25 19	35 38	25 46	36 15	26 13	36 52	26 41
58	32 31	23 30	33 8	23 57	33 45	24 24	34 22	24 52	34 59	25 19	35 36	25 47	36 13	26 14	36 50	26 42

Seconds of H. P.		
″	Corr	A
	″	″
1	1	0
2	1	1
3	2	1
4	2	2
5	3	2
6	4	3
7	4	3
8	5	4
9	6	4
10	6	5
11	7	5
12	8	5
13	8	6
14	9	6
15	10	7
16	10	7
17	11	8
18	11	8
19	12	9
20	13	9
21	13	10
22	14	10
23	15	10
24	15	11
25	16	11
26	17	12
27	17	12
28	18	13
29	18	13
30	19	14
31	20	14
32	20	14
33	21	15
34	22	15
35	22	16
36	23	16
37	23	17
38	24	17
39	25	18
40	25	18
41	26	19
42	27	19
43	27	19
44	28	20
45	29	20
46	29	21
47	30	21
48	30	22
49	31	22
50	32	23
51	32	23
52	33	23
53	34	24
54	34	24
55	35	25
56	35	25
57	36	26
58	37	26
59	37	27
Alt.	☉	*
	A	A
3	8	8
4	6	5
5	4	4
6	3	3
7	3	2
8	2	2
9	2	1
10	2	1
20	2	0
30	3	0
40	3	0
50	4	0
60	4	0
70	5	0
80	5	0

Correction of the Moon's Altitude, and the Aux. Angle A. (52° and 53°)

App. Alt.	Minutes of Moon's Hor. Parallax. 54′		55′		56′		57′		58′		59′		60′		61′	
52°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr +	A 60°	Corr. +	A 60°	Corr. +	A 60°
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
0′	32 30	23 30	33 7	23 58	33 44	24 25	34 21	24 53	34 58	25 20	35 35	25 47	36 12	26 15	36 49	26 42
2	32 28	23 31	33 5	23 58	33 42	24 26	34 19	24 53	34 56	25 21	35 33	25 48	36 10	26 16	36 47	26 43
4	32 27	23 32	33 4	23 59	33 41	24 27	34 18	24 54	34 55	25 21	35 32	25 49	36 8	26 16	36 45	26 44
6	32 26	23 32	33 2	24 0	33 39	24 27	34 16	24 55	34 53	25 22	35 30	25 50	36 7	26 17	36 44	26 44
8	32 24	23 33	33 1	24 0	33 38	24 28	34 15	24 55	34 51	25 23	35 28	25 50	36 5	26 18	36 42	26 45
10	32 23	23 34	33 0	24 1	33 36	24 29	34 13	24 56	34 50	25 23	35 27	25 51	36 4	26 18	36 40	26 46
12	32 21	23 34	32 58	24 2	33 35	24 29	34 12	24 57	34 48	25 24	35 25	25 52	36 2	26 19	36 39	26 47
14	32 20	23 35	32 57	24 2	33 33	24 30	34 10	24 57	34 47	25 25	35 24	25 52	36 0	26 20	36 37	26 47
16	32 18	23 35	32 55	24 3	33 32	24 31	34 9	24 58	34 45	25 26	35 22	25 53	35 59	26 21	36 35	26 48
18	32 17	23 36	32 54	24 4	33 30	24 31	34 7	24 59	34 44	25 26	35 20	25 54	35 57	26 21	36 34	26 49
20	32 15	23 37	32 52	24 4	33 29	24 32	34 5	24 59	34 42	25 27	35 19	25 54	35 55	26 22	36 32	26 50
22	32 14	23 37	32 51	24 5	33 27	24 33	34 3	25 0	34 41	25 28	35 17	25 55	35 54	26 23	36 31	26 50
24	32 13	23 38	32 49	24 6	33 26	24 33	34 2	25 1	34 39	25 28	35 16	25 56	35 52	26 23	36 29	26 51
26	32 11	23 39	32 48	24 6	33 24	24 34	34 1	25 1	34 38	25 29	35 14	25 57	35 51	26 24	36 27	26 52
28	32 10	23 39	32 46	24 7	33 23	24 35	33 59	25 2	34 36	25 30	35 13	25 57	35 49	26 25	36 26	26 53
30	32 8	23 40	32 45	24 8	33 21	24 35	33 58	25 3	34 34	25 30	35 11	25 58	35 47	26 26	36 24	26 53
32	32 7	23 41	32 43	24 8	33 20	24 36	33 56	25 4	34 33	25 31	35 9	25 59	35 46	26 26	36 22	26 54
34	32 5	23 41	32 42	24 9	33 18	24 37	33 55	25 4	34 31	25 32	35 8	26 0	35 44	26 27	36 21	26 55
36	32 4	23 42	32 40	24 10	33 17	24 37	33 53	25 5	34 30	25 33	35 6	26 0	35 43	26 28	36 19	26 56
38	32 3	23 43	32 39	24 10	33 15	24 38	33 52	25 6	34 28	25 33	35 5	26 1	35 41	26 29	36 18	26 56
40	32 1	23 43	32 37	24 11	33 14	24 39	33 50	25 6	34 27	25 34	35 3	26 2	35 39	26 29	36 16	26 57
42	32 0	23 44	32 36	24 12	33 12	24 39	33 49	25 7	34 25	25 35	35 2	26 2	35 38	26 30	36 14	26 58
44	31 58	23 45	32 35	24 12	33 11	24 40	33 47	25 8	34 24	25 35	35 0	26 3	35 36	26 31	36 13	26 58
46	31 57	23 45	32 33	24 13	33 9	24 41	33 46	25 8	34 22	25 36	34 58	26 4	35 35	26 31	36 11	26 59
48	31 55	23 46	32 32	24 14	33 8	24 41	33 44	25 9	34 20	25 37	34 57	26 4	35 33	26 32	36 9	27 0
50	31 54	23 47	32 30	24 14	33 6	24 42	33 43	25 10	34 19	25 37	34 55	26 5	35 31	26 33	36 8	27 1
52	31 52	23 47	32 29	24 15	33 5	24 43	33 41	25 10	34 17	25 38	34 54	26 6	35 30	26 34	36 6	27 1
54	31 51	23 48	32 27	24 16	33 3	24 43	33 40	25 11	34 16	25 39	34 52	26 7	35 28	26 34	36 4	27 2
56	31 50	23 49	32 26	24 16	33 2	24 44	33 38	25 12	34 14	25 40	34 50	26 7	35 27	26 35	36 3	27 3
58	31 48	23 49	32 24	24 17	33 0	24 45	33 37	25 13	34 13	25 40	34 49	26 8	35 25	26 36	36 1	27 4
53°	54′		55′		56′		57′		58′		59′		60′		61′	
0′	31 47	23 50	32 23	24 18	32 59	24 45	33 35	25 13	34 11	25 41	34 47	26 9	35 23	26 36	35 59	27 4
2	31 45	23 51	32 21	24 18	32 57	24 46	33 33	25 14	34 10	25 42	34 46	26 9	35 22	26 37	35 58	27 5
4	31 44	23 51	32 20	24 19	32 56	24 47	33 32	25 15	34 8	25 42	34 44	26 10	35 20	26 38	35 56	27 6
6	31 42	23 52	32 18	24 20	32 54	24 47	33 30	25 15	34 6	25 43	34 42	26 11	35 18	26 39	35 55	27 6
8	31 41	23 52	32 17	24 20	32 53	24 48	33 29	25 16	34 5	25 44	34 41	26 11	35 17	26 39	35 53	27 7
10	31 39	23 53	32 15	24 21	32 51	24 49	33 27	25 17	34 3	25 44	34 39	26 12	35 15	26 40	35 51	27 8
12	31 38	23 54	32 14	24 22	32 50	24 49	33 26	25 17	34 2	25 45	34 38	26 13	35 14	26 41	35 50	27 9
14	31 36	23 54	32 12	24 22	32 48	24 50	33 24	25 18	34 0	25 46	34 36	26 14	35 12	26 41	35 48	27 9
16	31 35	23 55	32 11	24 23	32 47	24 51	33 23	25 19	33 59	25 46	34 34	26 14	35 10	26 42	35 46	27 10
18	31 34	23 56	32 9	24 24	32 45	24 51	33 21	25 19	33 57	25 47	34 33	26 15	35 9	26 43	35 45	27 11
20	31 32	23 56	32 8	24 24	32 44	24 52	33 20	25 20	33 55	25 48	34 31	26 16	35 7	26 44	35 43	27 11
22	31 31	23 57	32 6	24 25	32 42	24 53	33 18	25 21	33 54	25 48	34 30	26 16	35 5	26 44	35 41	27 12
24	31 29	23 58	32 5	24 25	32 41	24 53	33 16	25 21	33 52	25 49	34 28	26 17	35 4	26 45	35 40	27 13
26	31 28	23 58	32 3	24 26	32 39	24 54	33 15	25 22	33 51	25 50	34 26	26 18	35 2	26 46	35 38	27 14
28	31 26	23 59	32 2	24 27	32 38	24 55	33 13	25 23	33 49	25 51	34 25	26 18	35 1	26 46	35 36	27 14
30	31 25	23 59	32 0	24 27	32 36	24 55	33 12	25 23	33 47	25 51	34 23	26 19	34 59	26 47	35 35	27 15
32	31 23	24 0	31 59	24 28	32 35	24 56	33 10	25 24	33 46	25 52	34 22	26 20	34 57	26 48	35 33	27 16
34	31 22	24 1	31 57	24 29	32 33	24 57	33 9	25 25	33 44	25 53	34 20	26 21	34 56	26 48	35 31	27 16
36	31 20	24 1	31 56	24 30	32 32	24 57	33 7	25 25	33 43	25 53	34 18	26 21	34 54	26 49	35 30	27 17
38	31 19	24 2	31 54	24 30	32 30	24 58	33 6	25 26	33 41	25 54	34 17	26 22	34 52	26 50	35 28	27 18
40	31 17	24 3	31 53	24 31	32 28	24 59	33 4	25 27	33 40	25 55	34 15	26 23	34 51	26 51	35 26	27 19
42	31 16	24 3	31 51	24 31	32 27	24 59	33 3	25 27	33 38	25 55	34 14	26 23	34 49	26 51	35 25	27 19
44	31 14	24 4	31 50	24 32	32 25	25 0	33 1	25 28	33 36	25 56	34 12	26 24	34 47	26 52	35 23	27 20
46	31 13	24 5	31 48	24 33	32 24	25 1	32 59	25 29	33 35	25 57	34 10	26 25	34 46	26 53	35 21	27 21
48	31 12	24 5	31 47	24 33	32 22	25 1	32 58	25 29	33 33	25 57	34 9	26 25	34 44	26 53	35 20	27 21
50	31 10	24 6	31 45	24 34	32 21	25 2	32 56	25 30	33 32	25 58	34 7	26 26	34 43	26 54	35 18	27 22
52	31 9	24 6	31 44	24 35	32 19	25 3	32 55	25 31	33 30	25 59	34 6	26 27	34 41	26 55	35 16	27 23
54	31 7	24 7	31 43	24 35	32 18	25 3	32 53	25 31	33 29	25 59	34 4	26 27	34 39	26 56	35 15	27 24
56	31 6	24 8	31 41	24 36	32 16	25 4	32 52	25 32	33 27	26 0	34 2	26 28	34 38	26 56	35 13	27 24
58	31 4	24 8	31 40	24 37	32 15	25 5	32 50	25 33	33 25	26 1	34 1	26 29	34 36	26 57	35 11	27 25

Seconds of H. P.		
″	Corr.	A ″
1	1	0
2	1	1
3	2	1
4	2	2
5	3	2
6	4	3
7	4	3
8	5	4
9	5	4
10	6	5
11	7	5
12	7	6
13	8	6
14	8	6
15	9	7
16	10	7
17	10	8
18	11	8
19	11	9
20	12	9
21	13	10
22	13	10
23	14	11
24	14	11
25	15	12
26	16	12
27	16	13
28	17	13
29	17	13
30	18	14
31	19	14
32	19	15
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34	20	16
35	21	16
36	22	17
37	22	17
38	23	18
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40	24	19
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43	26	20
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46	28	21
47	28	22
48	29	22
49	29	23
50	30	23
51	31	24
52	31	24
53	32	25
54	32	25
55	33	26
56	34	26
57	34	27
58	35	27
59	35	27
Alt. ☉	A ●	A ●
3	8	8
4	6	5
5	4	4
6	3	3
7	3	2
8	2	2
9	2	1
10	2	1
20	2	0
30	3	0
40	3	0
50	4	0
60	4	0
70	5	0
90	5	0

(54° and 55°) Correction of the Moon's Altitude, and the Aux. Angle A.

App. Alt.	Minutes of Moon's Hor. Parallax. 54′		55′		56′		57′		58′		59′		60′		61′	
54°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
0′	31 3	24 9	31 38	24 37	32 13	25 5	32 49	25 33	33 24	26 1	33 59	26 30	34 34	26 58	35 10	27 26
2	31 1	24 10	31 37	24 38	32 12	25 6	32 47	25 34	33 22	26 2	33 58	26 30	34 33	26 58	35 8	27 26
4	31 0	24 10	31 35	24 38	32 10	25 7	32 45	25 35	33 21	26 3	33 56	26 31	34 31	26 59	35 6	27 27
6	30 58	24 11	31 34	24 39	32 9	25 7	32 44	25 35	33 19	26 3	33 54	26 32	34 29	27 0	35 5	27 28
8	30 57	24 12	31 32	24 40	32 7	25 8	32 42	25 36	33 17	26 4	33 53	26 32	34 28	27 0	35 3	27 29
10	30 55	24 12	31 30	24 40	32 6	25 8	32 41	25 37	33 16	26 5	33 51	26 33	34 26	27 1	35 1	27 29
12	30 54	24 13	31 29	24 41	32 4	25 9	32 39	25 37	33 14	26 5	33 49	26 34	34 24	27 2	35 0	27 30
14	30 52	24 13	31 27	24 42	32 3	25 10	32 38	25 38	33 13	26 6	33 48	26 34	34 23	27 2	34 58	27 31
16	30 51	24 14	31 26	24 42	32 1	25 10	32 36	25 39	33 11	26 7	33 46	26 35	34 21	27 3	34 56	27 31
18	30 49	24 15	31 24	24 43	31 59	25 11	32 34	25 39	33 9	26 7	33 44	26 36	34 19	27 4	34 54	27 32
20	30 48	24 15	31 23	24 43	31 58	25 12	32 33	25 40	33 8	26 8	33 43	26 36	34 18	27 4	34 53	27 33
22	30 46	24 16	31 21	24 44	31 56	25 12	32 31	25 41	33 6	26 9	33 41	26 37	34 16	27 5	34 51	27 33
24	30 45	24 17	31 20	24 45	31 55	25 13	32 30	25 41	33 5	26 9	33 40	26 38	34 14	27 6	34 49	27 34
26	30 43	24 17	31 18	24 45	31 53	25 14	32 28	25 42	33 3	26 10	33 38	26 38	34 13	27 7	34 48	27 35
28	30 42	24 18	31 17	24 46	31 52	25 14	32 27	25 42	33 1	26 11	33 36	26 39	34 11	27 7	34 46	27 36
30	30 40	24 18	31 15	24 47	31 50	25 15	32 25	25 43	33 0	26 11	33 35	26 40	34 9	27 8	34 44	27 36
32	30 39	24 19	31 14	24 47	31 49	25 16	32 23	25 44	32 58	26 12	33 33	26 40	34 8	27 9	34 43	27 37
34	30 37	24 20	31 12	24 48	31 47	25 16	32 22	25 44	32 57	26 13	33 31	26 41	34 6	27 9	34 41	27 38
36	30 36	24 20	31 11	24 48	31 45	25 17	32 20	25 45	32 55	26 13	33 30	26 42	34 5	27 10	34 39	27 38
38	30 34	24 21	31 9	24 49	31 44	25 17	32 19	25 46	32 53	26 14	33 28	26 42	34 3	27 11	34 38	27 39
40	30 33	24 21	31 8	24 50	31 42	25 18	32 17	25 46	32 52	26 15	33 26	26 43	34 1	27 11	34 36	27 40
42	30 32	24 22	31 6	24 50	31 41	25 19	32 16	25 47	32 50	26 15	33 25	26 44	34 0	27 12	34 34	27 40
44	30 30	24 23	31 5	24 51	31 39	25 19	32 14	25 48	32 49	26 16	33 23	26 44	33 58	27 13	34 33	27 41
46	30 29	24 23	31 3	24 52	31 38	25 20	32 12	25 48	32 47	26 17	33 22	26 45	33 56	27 14	34 31	27 42
48	30 27	24 24	31 2	24 52	31 36	25 21	32 11	25 49	32 45	26 17	33 20	26 46	33 55	27 14	34 29	27 43
50	30 26	24 24	31 0	24 53	31 35	25 21	32 9	25 50	32 44	26 18	33 18	26 46	33 53	27 15	34 28	27 43
52	30 24	24 25	30 59	24 54	31 33	25 22	32 8	25 50	32 42	26 19	33 17	26 47	33 51	27 16	34 26	27 44
54	30 23	24 26	30 57	24 54	31 32	25 23	32 6	25 51	32 41	26 19	33 15	26 48	33 50	27 16	34 24	27 45
56	30 21	24 26	30 56	24 55	31 30	25 23	32 5	25 52	32 39	26 20	33 13	26 49	33 48	27 17	34 22	27 45
58	30 20	24 27	30 54	24 55	31 29	25 24	32 3	25 52	32 37	26 21	33 12	26 49	33 46	27 18	34 21	27 46
55°	54′		55′		56′		57′		58′		59′		60′		61′	
0′	30 18	24 28	30 52	24 56	31 27	25 24	32 1	25 53	32 36	26 21	33 10	26 50	33 45	27 18	34 19	27 47
2	30 17	24 28	30 51	24 57	31 25	25 25	32 0	25 54	32 34	26 22	33 9	26 51	33 43	27 19	34 17	27 47
4	30 15	24 29	30 49	24 57	31 24	25 26	31 58	25 54	32 33	26 23	33 7	26 51	33 41	27 20	34 16	27 48
6	30 14	24 29	30 48	24 58	31 22	25 26	31 57	25 55	32 31	26 23	33 5	26 52	33 40	27 20	34 14	27 49
8	30 12	24 30	30 46	24 59	31 21	25 27	31 55	25 56	32 29	26 24	33 4	26 53	33 38	27 21	34 12	27 50
10	30 11	24 31	30 45	24 59	31 19	25 28	31 53	25 56	32 28	26 25	33 2	26 53	33 36	27 22	34 11	27 50
12	30 9	24 31	30 43	25 0	31 18	25 28	31 52	25 57	32 26	26 25	33 0	26 54	33 35	27 22	34 9	27 51
14	30 8	24 32	30 42	25 0	31 16	25 29	31 50	25 57	32 24	26 26	32 59	26 55	33 33	27 23	34 7	27 52
16	30 6	24 32	30 40	25 1	31 15	25 30	31 49	25 58	32 23	26 27	32 57	26 56	33 31	27 24	34 5	27 52
18	30 5	24 33	30 39	25 2	31 13	25 30	31 47	25 59	32 21	26 27	32 55	26 56	33 30	27 24	34 4	27 53
20	30 3	24 34	30 37	25 2	31 11	25 31	31 45	25 59	32 20	26 28	32 54	26 56	33 28	27 25	34 2	27 54
22	30 2	24 34	30 36	25 3	31 10	25 31	31 44	26 0	32 18	26 29	32 52	26 57	33 26	27 26	34 0	27 54
24	30 0	24 35	30 34	25 4	31 8	25 32	31 42	26 1	32 16	26 29	32 50	26 58	33 25	27 26	33 59	27 55
26	29 59	24 35	30 33	25 4	31 7	25 33	31 41	26 1	32 15	26 30	32 49	26 58	33 23	27 27	33 57	27 56
28	29 57	24 36	30 31	25 5	31 5	25 33	31 39	26 2	32 13	26 30	32 47	26 59	33 21	27 28	33 55	27 56
30	29 56	24 37	30 30	25 5	31 4	25 34	31 38	26 3	32 11	26 31	32 45	27 0	33 19	27 28	33 53	27 57
32	29 54	24 37	30 28	25 6	31 2	25 35	31 36	26 3	32 10	26 32	32 44	27 0	33 18	27 29	33 52	27 58
34	29 53	24 38	30 26	25 7	31 0	25 35	31 34	26 4	32 8	26 32	32 42	27 1	33 16	27 30	33 50	27 58
36	29 51	24 38	30 25	25 7	30 59	25 36	31 33	26 5	32 7	26 33	32 41	27 2	33 14	27 30	33 48	27 59
38	29 50	24 39	30 23	25 8	30 57	25 36	31 31	26 5	32 5	26 34	32 39	27 2	33 13	27 31	33 47	28 0
40	29 48	24 40	30 22	25 8	30 56	25 37	31 30	26 6	32 3	26 34	32 37	27 3	33 11	27 32	33 45	28 0
42	29 46	24 40	30 20	25 9	30 54	25 38	31 28	26 6	32 2	26 35	32 36	27 4	33 9	27 32	33 43	28 1
44	29 45	24 41	30 19	25 10	30 53	25 38	31 26	26 7	32 0	26 36	32 34	27 4	33 8	27 33	33 42	28 2
46	29 43	24 42	30 17	25 10	30 51	25 39	31 25	26 8	31 59	26 36	32 32	27 5	33 6	27 34	33 40	28 3
48	29 42	24 42	30 16	25 11	30 49	25 40	31 23	26 8	31 57	26 37	32 31	27 6	33 4	27 34	33 38	28 3
50	29 40	24 43	30 14	25 11	30 48	25 40	31 22	26 9	31 55	26 38	32 29	27 6	33 3	27 35	33 36	28 4
52	29 39	24 43	30 13	25 12	30 46	25 41	31 20	26 10	31 54	26 38	32 27	27 7	33 1	27 36	33 35	28 5
54	29 37	24 44	30 11	25 13	30 45	25 42	31 18	26 10	31 52	26 39	32 26	27 8	32 59	27 36	33 33	28 5
56	29 36	24 45	30 10	25 13	30 43	25 42	31 17	26 11	31 50	26 40	32 24	27 8	32 58	27 37	33 31	28 6
58	29 34	24 45	30 8	25 14	30 42	25 43	31 15	26 12	31 49	26 40	32 22	27 9	32 56	27 38	33 30	28 7

Seconds of H. P.			
″		Cor.	A
		″	″
1		1	0
2		1	1
3		2	1
4		2	2
5		3	2
6		3	3
7		4	3
8		5	4
9		5	4
10		6	5
11		6	5
12		7	6
13		7	6
14		8	7
15		9	7
16		9	8
17		10	8
18		10	9
19		11	9
20		11	10
21		12	10
22		13	10
23		13	11
24		14	11
25		14	12
26		15	12
27		16	13
28		16	13
29		17	14
30		17	14
31		18	15
32		18	15
33		19	16
34		20	16
35		20	17
36		21	17
37		21	18
38		22	18
39		22	19
40		23	19
41		24	19
42		24	20
43		25	20
44		25	21
45		26	21
46		26	22
47		27	22
48		28	23
49		28	23
50		29	24
51		29	24
52		30	25
53		30	25
54		31	26
55		32	26
56		32	27
57		33	27
58		33	28
59		34	28
Alt.	☉	A	●
		″	″
3		8	8
4		6	5
5		4	4
6		3	3
7		3	2
8		2	2
9		2	1
10		2	1
20		2	0
30		3	0
40		3	0
50		4	0
60		4	0
70		5	0
90		5	0

Correction of the Moon's Altitude, and the Aux. Angle A. (56° and 57°)

App. Alt.	Minutes of Moon's Hor. Parallax. 54′		55′		56′		57		58′		59′		60′		61′	
56°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr +	A 60°	Corr. −	A 60°
	′ ″	′ ″	′ ″	′ ″	″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
0′	29 33	24 46	30 7	25 15	30 40	25 43	31 14	26 12	31 47	26 41	32 21	27 10	32 54	27 38	33 28	28 7
2	29 31	24 46	30 5	25 15	30 39	25 44	31 12	26 13	31 46	26 42	32 19	27 10	32 53	27 39	33 26	28 8
4	29 30	24 47	30 3	25 16	30 37	25 45	31 10	26 13	31 44	26 42	32 17	27 11	32 51	27 40	33 24	28 9
6	29 28	24 48	30 2	25 16	30 35	25 45	31 9	26 14	31 42	26 43	32 16	27 12	32 49	27 40	33 23	28 9
8	29 27	24 48	30 0	25 17	30 34	25 46	31 7	26 15	31 41	26 43	32 14	27 12	32 48	27 41	33 21	28 10
10	29 25	24 49	29 59	25 18	30 32	25 46	31 6	26 15	31 39	26 44	32 12	27 13	32 46	27 42	33 19	28 11
12	29 24	24 49	29 57	25 18	30 31	25 47	31 4	26 16	31 37	26 45	32 11	27 14	32 44	27 42	33 18	28 11
14	29 22	24 50	29 56	25 19	30 29	25 48	31 2	26 17	31 36	26 45	32 9	27 14	32 42	27 43	33 16	28 12
16	29 21	24 51	29 54	25 19	30 27	25 48	31 1	26 17	31 34	26 46	32 7	27 15	32 41	27 44	33 14	28 13
18	29 19	24 51	29 53	25 20	30 26	25 49	30 59	26 18	31 33	26 47	32 6	27 16	32 39	27 44	33 12	28 13
20	29 18	24 52	29 51	25 21	30 24	25 49	30 58	26 18	31 31	26 47	32 4	27 16	32 37	27 45	33 11	28 14
22	29 16	24 52	29 50	25 21	30 23	25 50	30 56	26 19	31 29	26 48	32 2	27 17	32 36	27 46	33 9	28 15
24	29 15	24 53	29 48	25 22	30 21	25 51	30 54	26 20	31 28	26 49	32 0	27 17	32 34	27 46	33 7	28 15
26	29 13	24 53	29 46	25 22	30 20	25 51	30 53	26 20	31 26	26 49	31 59	27 18	32 32	27 47	33 6	28 16
28	29 12	24 54	29 45	25 23	30 18	25 52	30 51	26 21	31 24	26 50	31 57	27 19	32 31	27 48	33 4	28 17
30	29 10	24 55	29 43	25 24	30 16	25 53	30 50	26 22	31 23	26 50	31 56	27 19	32 29	27 48	33 2	28 17
32	29 9	24 55	29 42	25 24	30 15	25 53	30 48	26 22	31 21	26 51	31 54	27 20	32 27	27 49	33 0	28 18
34	29 7	24 56	29 40	25 25	30 13	25 54	30 46	26 23	31 19	26 52	31 52	27 21	32 25	27 50	32 59	28 19
36	29 6	24 56	29 39	25 25	30 12	25 54	30 45	26 23	31 18	26 52	31 51	27 21	32 24	27 50	32 57	28 19
38	29 4	24 57	29 37	25 26	30 10	25 55	30 43	26 24	31 16	26 53	31 49	27 22	32 22	27 51	32 55	28 20
40	29 2	24 58	29 35	25 27	30 8	25 56	30 41	26 25	31 14	26 54	31 47	27 23	32 20	27 52	32 53	28 21
42	29 1	24 58	29 34	25 27	30 7	25 56	30 40	26 25	31 13	26 54	31 46	27 23	32 19	27 52	32 52	28 21
44	28 59	24 59	29 32	25 28	30 5	25 57	30 38	26 26	31 11	26 55	31 44	27 24	32 17	27 53	32 50	28 22
46	28 58	24 59	29 31	25 28	30 4	25 58	30 37	26 27	31 10	26 56	31 42	27 25	32 15	27 54	32 48	28 23
48	28 56	25 0	29 29	25 29	30 2	25 58	30 35	26 27	31 8	26 56	31 41	27 25	32 14	27 54	32 47	28 23
50	28 55	25 1	29 28	25 30	30 1	25 59	30 33	26 28	31 6	26 57	31 39	27 26	32 12	27 55	32 45	28 24
52	28 53	25 1	29 26	25 30	29 59	25 59	30 32	26 28	31 5	26 57	31 37	27 27	32 10	27 56	32 43	28 25
54	28 52	25 2	29 25	25 31	29 57	26 0	30 30	26 29	31 3	26 58	31 36	27 27	32 0	27 56	32 41	28 25
56	28 50	25 2	29 23	25 31	29 56	26 1	30 29	26 30	31 1	26 59	31 34	27 28	32 7	27 57	32 40	28 26
58	28 49	25 3	29 22	25 32	29 54	26 1	30 27	26 30	31 0	26 59	31 32	27 28	32 5	27 58	32 38	28 27
57°	54′		55′		56′		57′		58′		59′		60′		61′	
0′	28 47	25 4	29 20	25 33	29 53	26 2	30 25	26 31	30 58	27 0	31 31	27 29	32 3	27 58	32 36	28 27
2	28 46	25 4	29 18	25 33	29 51	26 2	30 24	26 32	30 56	27 1	31 29	27 30	32 2	27 59	32 34	28 28
4	28 44	25 5	29 17	25 34	29 49	26 3	30 22	26 32	30 55	27 1	31 27	27 30	32 0	27 59	32 33	28 29
6	28 43	25 5	29 15	25 34	29 48	26 4	30 21	26 33	30 53	27 2	31 26	27 31	31 58	28 0	32 31	28 29
8	28 41	25 6	29 14	25 35	29 46	26 4	30 19	26 33	30 51	27 2	31 24	27 32	31 57	28 1	32 29	28 30
10	28 40	25 6	29 12	25 36	29 45	26 5	30 17	26 34	30 50	27 3	31 22	27 32	31 55	28 1	32 27	28 31
12	28 38	25 7	29 11	25 36	29 43	26 5	30 16	26 35	30 48	27 4	31 21	27 33	31 53	28 2	32 26	28 31
14	28 37	25 8	29 9	25 37	29 41	26 6	30 14	26 35	30 46	27 4	31 19	27 34	31 51	28 3	32 24	28 32
16	28 35	25 8	29 7	25 37	29 40	26 7	30 12	26 36	30 45	27 5	31 17	27 34	31 50	28 3	32 22	28 33
18	28 33	25 9	29 6	25 38	29 38	26 7	30 11	26 36	30 43	27 6	31 16	27 35	31 48	28 4	32 20	28 33
20	28 32	25 9	29 4	25 38	29 37	26 8	30 9	26 37	30 41	27 6	31 14	27 35	31 46	28 5	32 19	28 34
22	28 30	25 10	29 3	25 39	29 35	26 8	30 7	26 38	30 40	27 7	31 12	27 36	31 45	28 5	32 17	28 35
24	28 29	25 10	29 1	25 40	29 33	26 9	30 6	26 38	30 38	27 7	31 10	27 37	31 43	28 6	32 15	28 35
26	28 27	25 11	28 59	25 40	29 32	26 10	30 4	26 39	30 36	27 8	31 9	27 37	31 41	28 7	32 13	28 36
28	28 26	25 12	28 58	25 41	29 30	26 10	30 3	26 39	30 35	27 9	31 7	27 38	31 39	28 7	32 12	28 36
30	28 24	25 12	28 56	25 41	29 29	26 11	30 1	26 40	30 33	27 9	31 5	27 38	31 38	28 8	32 10	28 37
32	28 23	25 13	28 55	25 42	29 27	26 11	29 59	26 41	30 31	27 10	31 4	27 39	31 36	28 8	32 8	28 38
34	28 21	25 13	28 53	25 43	29 25	26 12	29 58	26 41	30 30	27 10	31 2	27 40	31 34	28 9	32 6	28 38
36	28 19	25 14	28 52	25 43	29 24	26 13	29 56	26 42	30 28	27 11	31 0	27 40	31 32	28 10	32 5	28 39
38	28 18	25 15	28 50	25 44	29 22	26 13	29 54	26 42	30 26	27 12	30 59	27 41	31 31	28 10	32 3	28 40
40	28 16	25 15	28 48	25 44	29 21	26 14	29 53	26 43	30 25	27 12	30 57	27 42	31 29	28 11	32 1	28 40
42	28 15	25 16	28 47	25 45	29 19	26 14	29 51	26 44	30 23	27 13	30 55	27 42	31 27	28 12	31 59	28 41
44	28 13	25 16	28 45	25 46	29 17	26 15	29 49	26 44	30 21	27 14	30 54	27 43	31 26	28 12	31 58	28 42
46	28 12	25 17	28 44	25 46	29 16	26 15	29 48	26 45	30 20	27 14	30 52	27 43	31 24	28 13	31 56	28 42
48	28 10	25 17	28 42	25 47	29 14	26 16	29 46	26 45	30 18	27 15	30 50	27 44	31 22	28 13	31 54	28 43
50	28 9	25 18	28 41	25 47	29 13	26 17	29 45	26 46	30 16	27 15	30 48	27 45	31 20	28 14	31 52	28 44
52	28 7	25 19	28 39	25 48	29 11	26 17	29 43	26 47	30 15	27 16	30 47	27 45	31 19	28 15	31 51	28 44
54	28 6	25 19	28 38	25 48	29 9	26 18	29 41	26 47	30 13	27 17	30 45	27 46	31 17	28 15	31 49	28 45
56	28 4	25 20	28 36	25 49	29 8	26 18	29 40	26 48	30 12	27 17	30 43	27 47	31 15	28 16	31 47	28 45
58	28 3	25 20	28 34	25 50	29 6	26 19	29 38	26 48	30 10	27 18	30 42	27 47	31 14	28 17	31 45	28 46

Seconds of H. P.		
″	Corr.	A
	″	″
1	1	0
2	1	1
3	2	1
4	2	2
5	3	2
6	3	3
7	4	3
8	4	4
9	5	4
10	5	5
11	6	5
12	7	6
13	7	6
14	8	7
15	8	7
16	9	8
17	9	8
18	10	9
19	10	9
20	11	10
21	12	10
22	12	11
23	13	11
24	13	12
25	14	12
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27	15	13
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31	17	15
32	18	16
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34	19	16
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42	23	20
43	24	21
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51	28	25
52	29	25
53	29	26
54	30	26
55	30	27
56	31	27
57	31	28
58	32	28
59	32	29
Alt.	☽	●
°	⊙	○
3	8	8
4	6	5
5	4	4
6	3	3
7	3	2
8	2	2
9	2	1
10	2	1
20	2	0
30	3	0
40	3	0
50	4	0
60	4	0
70	5	0
90	6	0

(58° and 59°) Correction of the Moon's Altitude, and the Aux. Angle A.

App. Alt.	Minutes of Moon's Hor. Parallax. 54′		55′		56′		57′		58′		59′		60′		61′	
58°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
0′	28 1	25 21	28 33	25 50	29 5	26 20	29 36	26 49	30 8	27 18	30 40	27 48	31 12	28 17	31 44	28 47
2	27 59	25 21	28 31	25 51	29 3	26 20	29 35	26 50	30 7	27 19	30 38	27 49	31 10	28 18	31 42	28 47
4	27 58	25 22	28 30	25 51	29 1	26 21	29 33	26 50	30 5	27 20	30 37	27 49	31 8	28 19	31 40	28 48
6	27 56	25 22	28 28	25 52	29 0	26 21	29 31	26 51	30 3	27 20	30 35	27 50	31 7	28 19	31 38	28 49
8	27 55	25 23	28 26	25 52	28 58	26 22	29 30	26 51	30 1	27 21	30 33	27 50	31 5	28 20	31 37	28 49
10	27 53	25 24	28 25	25 53	28 56	26 23	29 28	26 52	30 0	27 21	30 31	27 51	31 3	28 20	31 35	28 50
12	27 52	25 24	28 23	25 54	28 55	26 23	29 26	26 53	29 58	27 22	30 30	27 52	31 1	28 21	31 33	28 51
14	27 50	25 25	28 22	25 54	28 53	26 24	29 25	26 53	29 56	27 23	30 28	27 52	31 0	28 22	31 31	28 51
16	27 49	25 25	28 20	25 55	28 52	26 24	29 23	26 54	29 55	27 23	30 26	27 53	30 58	28 22	31 30	28 52
18	27 47	25 26	28 18	25 55	28 50	26 25	29 22	26 54	29 53	27 24	30 25	27 53	30 56	28 23	31 28	28 52
20	27 45	25 26	28 17	25 56	28 48	26 25	29 20	26 55	29 51	27 24	30 23	27 54	30 54	28 24	31 26	28 53
22	27 44	25 27	28 15	25 56	28 47	26 26	29 18	26 56	29 50	27 25	30 21	27 55	30 53	28 24	31 24	28 54
24	27 42	25 28	28 14	25 57	28 45	26 27	29 17	26 56	29 48	27 26	30 19	27 55	30 51	28 25	31 22	28 54
26	27 41	25 28	28 12	25 58	28 44	26 27	29 15	26 57	29 46	27 26	30 18	27 56	30 49	28 25	31 21	28 55
28	27 39	25 29	28 11	25 58	28 42	26 28	29 13	26 57	29 45	27 27	30 16	27 56	30 47	28 26	31 19	28 56
30	27 38	25 29	28 9	25 59	28 40	26 28	29 12	26 58	29 43	27 27	30 14	27 57	30 46	28 27	31 17	28 56
32	27 36	25 30	28 7	25 59	28 39	26 29	29 10	26 59	29 41	27 28	30 13	27 58	30 44	28 27	31 15	28 57
34	27 34	25 30	28 6	26 0	28 37	26 30	29 8	26 59	29 40	27 29	30 11	27 58	30 42	28 28	31 14	28 57
36	27 33	25 31	28 4	26 0	28 35	26 30	29 7	27 0	29 38	27 29	30 9	27 59	30 40	28 29	31 12	28 58
38	27 31	25 31	28 3	26 1	28 34	26 31	29 5	27 0	29 36	27 30	30 8	27 59	30 39	28 29	31 10	28 59
40	27 30	25 32	28 1	26 2	28 32	26 31	29 3	27 1	29 35	27 30	30 6	28 0	30 37	28 30	31 8	28 59
42	27 28	25 33	27 59	26 2	28 31	26 32	29 2	27 1	29 33	27 31	30 4	28 1	30 35	28 30	31 7	29 0
44	27 27	25 33	27 58	26 3	28 29	26 32	29 0	27 2	29 31	27 32	30 2	28 1	30 34	28 31	31 5	29 1
46	27 25	25 34	27 56	26 3	28 27	26 33	28 58	27 3	29 30	27 32	30 1	28 2	30 32	28 32	31 3	29 1
48	27 24	25 34	27 55	26 4	28 26	26 34	28 57	27 3	29 28	27 33	29 59	28 3	30 30	28 32	31 1	29 2
50	27 22	25 35	27 53	26 4	28 24	26 34	28 55	27 4	29 26	27 33	29 57	28 3	30 28	28 33	30 59	29 3
52	27 20	25 35	27 51	26 5	28 22	26 35	28 53	27 4	29 25	27 34	29 56	28 4	30 27	28 34	30 58	29 3
54	27 19	25 36	27 50	26 6	28 21	26 35	28 52	27 5	29 23	27 35	29 54	28 4	30 25	28 34	30 56	29 4
56	27 17	25 36	27 48	26 6	28 19	26 36	28 50	27 6	29 21	27 35	29 52	28 5	30 23	28 35	30 54	29 4
58	27 16	25 37	27 47	26 7	28 18	26 37	28 49	27 6	29 19	27 36	29 50	28 6	30 21	28 35	30 52	29 5
59°	54′		55′		56′		57′		58′		59′		60′		61′	
0	27 14	25 38	27 45	26 7	28 16	26 37	28 47	27 7	29 18	27 36	29 49	28 6	30 20	28 36	30 51	29 6
2	27 13	25 38	27 43	26 8	28 14	26 38	28 45	27 7	29 16	27 37	29 47	28 7	30 18	28 37	30 49	29 6
4	27 11	25 39	27 42	26 8	28 13	26 38	28 44	27 8	29 14	27 38	29 45	28 7	30 16	28 37	30 47	29 7
6	27 9	25 39	27 40	26 9	28 11	26 39	28 42	27 9	29 13	27 38	29 44	28 8	30 14	28 38	30 45	29 7
8	27 8	25 40	27 39	26 9	28 9	26 39	28 40	27 9	29 11	27 39	29 42	28 9	30 13	28 38	30 43	29 8
10	27 6	25 40	27 37	26 10	28 8	26 40	28 39	27 10	29 9	27 39	29 40	28 9	30 11	28 39	30 42	29 8
12	27 5	25 41	27 35	26 11	28 6	26 40	28 37	27 10	29 8	27 40	29 38	28 10	30 9	28 40	30 40	29 9
14	27 3	25 41	27 34	26 11	28 5	26 41	28 35	27 11	29 6	27 41	29 37	28 10	30 7	28 40	30 38	29 9
16	27 2	25 42	27 32	26 12	28 3	26 42	28 34	27 11	29 4	27 41	29 35	28 11	30 6	28 41	30 36	29 10
18	27 0	25 42	27 31	26 12	28 1	26 42	28 32	27 12	29 3	27 42	29 33	28 12	30 4	28 41	30 34	29 11
20	26 58	25 43	27 29	26 13	28 0	26 43	28 30	27 12	29 1	27 42	29 31	28 12	30 2	28 42	30 33	29 12
22	26 57	25 44	27 27	26 13	27 58	26 43	28 29	27 13	28 59	27 43	29 30	28 13	30 0	28 43	30 31	29 12
24	26 55	25 44	27 26	26 14	27 56	26 44	28 27	27 14	28 57	27 43	29 28	28 13	29 58	28 43	30 29	29 13
26	26 54	25 45	27 24	26 14	27 55	26 44	28 25	27 14	28 56	27 44	29 26	28 14	29 57	28 44	30 27	29 14
28	26 52	25 45	27 23	26 15	27 53	26 45	28 24	27 15	28 54	27 45	29 25	28 14	29 55	28 44	30 26	29 14
30	26 51	25 46	27 21	26 16	27 51	26 45	28 22	27 15	28 52	27 45	29 23	28 15	29 53	28 45	30 24	29 15
32	26 49	25 46	27 19	26 16	27 50	26 46	28 20	27 16	28 51	27 46	29 21	28 16	29 51	28 45	30 22	29 15
34	26 47	25 47	27 18	26 17	27 48	26 47	28 19	27 16	28 49	27 46	29 19	28 16	29 50	28 46	30 20	29 16
36	26 46	25 47	27 16	26 17	27 47	26 47	28 17	27 17	28 47	27 47	29 18	28 17	29 48	28 47	30 18	29 17
38	26 44	25 48	27 15	26 18	27 45	26 48	28 15	27 18	28 46	27 48	29 16	28 17	29 46	28 47	30 17	29 17
40	26 43	25 48	27 13	26 18	27 43	26 48	28 14	27 18	28 44	27 48	29 14	28 18	29 44	28 48	30 15	29 18
42	26 41	25 49	27 11	26 19	27 42	26 49	28 12	27 19	28 42	27 49	29 12	28 19	29 43	28 48	30 13	29 19
44	26 40	25 50	27 10	26 19	27 40	26 49	28 10	27 19	28 40	27 49	29 11	28 19	29 41	28 49	30 11	29 19
46	26 38	25 50	27 8	26 20	27 38	26 50	28 9	27 20	28 39	27 50	29 9	28 20	29 39	28 50	30 9	29 20
48	26 36	25 51	27 7	26 21	27 37	26 51	28 7	27 21	28 37	27 50	29 7	28 20	29 37	28 50	30 8	29 20
50	26 35	25 51	27 5	26 21	27 35	26 51	28 5	27 21	28 35	27 51	29 6	28 21	29 36	28 51	30 6	29 21
52	26 33	25 52	27 3	26 22	27 33	26 52	28 4	27 22	28 34	27 52	29 4	28 22	29 34	28 52	30 4	29 22
54	26 32	25 52	27 2	26 22	27 32	26 52	28 2	27 22	28 32	27 52	29 2	28 22	29 32	28 52	30 2	29 22
56	26 30	25 53	27 0	26 23	27 30	26 53	28 0	27 23	28 30	27 53	29 0	28 23	29 30	28 53	30 0	29 23
58	26 28	25 53	26 59	26 23	27 29	26 53	27 59	27 23	28 29	27 53	28 59	28 23	29 29	28 53	29 59	29 23

Seconds of H. P.	Cor.	A
″	″	″
1	1	0
2	1	1
3	2	1
4	2	2
5	3	2
6	3	3
7	4	3
8	4	4
9	5	4
10	5	5
11	6	5
12	6	6
13	7	6
14	7	7
15	8	7
16	8	8
17	9	8
18	9	9
19	10	9
20	10	10
21	11	10
22	11	11
23	12	11
24	12	12
25	13	12
26	13	13
27	14	13
28	14	14
29	15	14
30	15	15
31	16	15
32	16	16
33	17	16
34	17	17
35	18	17
36	18	18
37	19	18
38	19	19
39	20	19
40	20	20
41	21	20
42	21	21
43	22	21
44	22	22
45	23	22
46	23	23
47	24	23
48	24	24
49	25	24
50	25	25
51	26	25
52	26	26
53	27	26
54	27	27
55	28	27
56	28	28
57	29	28
58	29	29
59	30	29
=	=	=
Alt. ☉	A	A *
3	8	8
4	6	5
5	4	4
6	3	3
7	3	2
8	2	2
9	2	1
10	2	1
20	2	0
30	3	0
40	3	0
50	4	0
60	4	0
70	5	0
80	5	0

Correction of the Moon's Altitude, and the Aux. Angle A. (60° and 61°)

App. Alt.	Minutes of Moon's Hor. Parallax. 54′		55′		56′		57′		58′		59′		60′		61′	
60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
0′	26 27	25 54	26 57	26 24	27 27	26 54	27 57	27 24	28 27	27 54	28 57	28 24	29 27	28 54	29 57	29 24
2	26 25	25 54	26 55	26 24	27 25	26 54	27 55	27 25	28 26	27 54	28 55	28 25	29 25	28 55	29 55	29 25
4	26 24	25 55	26 54	26 25	27 24	26 55	27 54	27 25	28 23	27 55	28 53	28 25	29 23	28 55	29 53	29 25
6	26 22	25 55	26 52	26 25	27 22	26 55	27 52	27 26	28 22	27 56	28 52	28 26	29 22	28 56	29 51	29 26
8	26 20	25 56	26 50	26 26	27 20	26 56	27 50	27 26	28 20	27 56	28 50	28 26	29 20	28 56	29 50	29 26
10	26 19	25 57	26 49	26 26	27 19	26 56	27 48	27 27	28 18	27 57	28 48	28 27	29 18	28 57	29 48	29 27
12	26 17	25 57	26 47	26 27	27 17	26 57	27 47	27 27	28 17	27 57	28 46	28 27	29 16	28 57	29 46	29 28
14	26 16	25 58	26 45	26 28	27 15	26 57	27 45	27 28	28 15	27 58	28 45	28 28	29 14	28 58	29 44	29 28
16	26 14	25 58	26 44	26 28	27 14	26 58	27 43	27 28	28 13	27 58	28 43	28 28	29 13	28 58	29 42	29 29
18	26 12	25 59	26 42	26 29	27 12	26 58	27 42	27 29	28 11	27 59	28 41	28 29	29 11	28 59	29 41	29 29
20	26 11	25 59	26 41	26 29	27 10	26 59	27 40	27 29	28 10	27 59	28 39	28 29	29 9	29 0	29 39	29 30
22	26 9	26 0	26 39	26 30	27 9	27 0	27 38	27 30	28 8	28 0	28 38	28 30	29 7	29 0	29 37	29 31
24	26 8	26 0	26 37	26 30	27 7	27 0	27 37	27 30	28 6	28 1	28 36	28 31	29 6	29 1	29 35	29 31
26	26 6	26 1	26 36	26 31	27 5	27 1	27 35	27 31	28 5	28 1	28 34	28 31	29 4	29 1	29 33	29 32
28	26 4	26 1	26 34	26 31	27 4	27 1	27 33	27 32	28 3	28 2	28 32	28 32	29 2	29 2	29 32	29 32
30	26 3	26 2	26 32	26 32	27 2	27 2	27 32	27 32	28 1	28 2	28 31	28 32	29 0	29 3	29 30	29 33
32	26 1	26 2	26 31	26 32	27 0	27 2	27 30	27 33	27 59	28 3	28 29	28 33	28 58	29 3	29 28	29 34
34	26 0	26 3	26 29	26 33	26 59	27 3	27 28	27 33	27 58	28 3	28 27	28 34	28 57	29 4	29 26	29 34
36	25 58	26 3	26 28	26 33	26 57	27 4	27 26	27 34	27 56	28 4	28 25	28 34	28 55	29 4	29 24	29 35
38	25 56	26 4	26 26	26 34	26 55	27 4	27 25	27 34	27 54	28 5	28 24	28 35	28 53	29 5	29 23	29 35
40	25 55	26 4	26 24	26 35	26 54	27 5	27 23	27 35	27 52	28 5	28 22	28 35	28 51	29 6	29 21	29 36
42	25 53	26 5	26 23	26 35	26 52	27 5	27 21	27 36	27 51	28 6	28 20	28 36	28 50	29 6	29 19	29 36
44	25 52	26 5	26 21	26 36	26 50	27 6	27 20	27 36	27 49	28 6	28 18	28 37	28 48	29 7	29 17	29 37
46	25 50	26 6	26 19	26 36	26 49	27 6	27 18	27 37	27 47	28 7	28 17	28 37	28 46	29 7	29 15	29 38
48	25 48	26 7	26 18	26 37	26 47	27 7	27 16	27 37	27 46	28 7	28 15	28 38	28 44	29 8	29 13	29 38
50	25 47	26 7	26 16	26 37	26 45	27 8	27 15	27 38	27 44	28 8	28 13	28 38	28 42	29 9	29 12	29 39
52	25 45	26 8	26 15	26 38	26 44	27 8	27 13	27 38	27 42	28 9	28 11	28 39	28 41	29 9	29 10	29 39
54	25 44	26 8	26 13	26 38	26 42	27 9	27 11	27 39	27 40	28 9	28 10	28 39	28 39	29 10	29 8	29 40
56	25 42	26 9	26 11	26 39	26 40	27 9	27 10	27 39	27 39	28 10	28 8	28 40	28 37	29 10	29 6	29 41
58	25 40	26 9	26 10	26 39	26 39	27 10	27 8	27 40	27 37	28 10	28 6	28 41	28 36	29 11	29 4	29 41
61°	54′		55′		56′		57′		58′		59′		60′		61′	
0′	25 39	26 10	26 8	25 40	26 37	27 10	27 6	27 41	27 35	28 11	28 4	28 41	28 33	29 11	29 3	29 42
2	25 37	26 10	26 6	26 41	26 35	27 11	27 4	27 41	27 34	28 11	28 3	28 42	28 32	29 12	29 1	29 42
4	25 36	26 11	26 5	26 41	26 34	27 11	27 3	27 42	27 32	28 12	28 0	28 42	28 30	29 13	28 59	29 43
6	25 34	26 11	26 3	26 42	26 32	27 12	27 1	27 42	27 30	28 13	27 59	28 43	28 28	29 13	28 57	29 44
8	25 32	26 12	26 1	26 42	26 30	27 12	26 59	27 43	27 28	28 13	27 57	28 43	28 26	29 14	28 55	29 44
10	25 31	26 12	26 0	26 43	26 29	27 13	26 58	27 43	27 27	28 14	27 56	28 44	28 24	29 14	28 53	29 45
12	25 29	26 13	25 58	26 43	26 27	27 13	26 56	27 44	27 25	28 14	27 54	28 44	28 23	29 15	28 52	29 45
14	25 28	26 13	25 56	26 44	26 25	27 14	26 54	27 44	27 23	28 15	27 52	28 45	28 21	29 15	28 50	29 46
16	25 26	26 14	25 55	26 44	26 24	27 15	26 53	27 45	27 21	28 15	27 50	28 46	28 19	29 16	28 48	29 46
18	25 24	26 14	25 53	26 45	26 22	27 15	26 51	27 45	27 20	28 16	27 48	28 46	28 17	29 17	28 46	29 47
20	25 23	26 15	25 51	26 45	26 20	27 16	26 49	27 46	27 18	28 16	27 47	28 47	28 16	29 17	28 44	29 47
22	25 21	26 15	25 50	26 46	26 19	27 16	26 47	27 47	27 16	28 17	27 45	28 47	28 14	29 18	28 42	29 48
24	25 19	26 16	25 48	26 46	26 17	27 17	26 46	27 47	27 14	28 17	27 43	28 48	28 12	29 18	28 41	29 49
26	25 18	26 16	25 47	26 47	26 15	27 17	26 44	27 48	27 13	28 18	27 41	28 48	28 10	29 19	28 39	29 49
28	25 16	26 17	25 45	26 47	26 14	27 18	26 42	27 48	27 11	28 18	27 40	28 49	28 8	29 19	28 37	29 50
30	25 15	26 17	25 43	26 48	26 12	27 18	26 41	27 49	27 9	28 19	27 38	28 49	28 6	29 20	28 35	29 50
32	25 13	26 18	25 42	26 48	26 10	27 19	26 39	27 49	27 7	28 20	27 36	28 50	28 5	29 21	28 33	29 51
34	25 11	26 18	25 40	26 49	26 9	27 19	26 37	27 50	27 6	28 20	27 34	28 51	28 3	29 21	28 31	29 52
36	25 10	26 19	25 38	26 49	26 7	27 20	26 35	27 50	27 4	28 21	27 33	28 51	28 1	29 22	28 30	29 52
38	25 8	26 19	25 37	26 50	26 5	27 20	26 34	27 51	27 2	28 21	27 31	28 52	27 59	29 22	28 28	29 53
40	25 7	26 20	25 35	26 50	26 4	27 21	26 32	27 51	27 0	28 22	27 29	28 52	27 57	29 23	28 26	29 53
42	25 5	26 20	25 33	26 51	26 2	27 21	26 30	27 52	26 59	28 22	27 27	28 53	27 56	29 23	28 24	29 54
44	25 3	26 21	25 32	26 51	26 0	27 22	26 29	27 52	26 57	28 23	27 25	28 53	27 54	29 24	28 22	29 54
46	25 2	26 21	25 30	26 52	25 59	27 22	26 27	27 53	26 55	28 23	27 24	28 54	27 52	29 24	28 21	29 55
48	25 0	26 22	25 29	26 52	25 57	27 23	26 25	27 54	26 54	28 24	27 22	28 54	27 50	29 25	28 19	29 56
50	24 59	26 22	25 27	26 53	25 55	27 23	26 24	27 54	26 52	28 25	27 20	28 55	27 48	29 26	28 17	29 56
52	24 57	26 23	25 25	26 54	25 54	27 24	26 22	27 55	26 50	28 26	27 18	28 56	27 47	29 26	28 15	29 57
54	24 55	26 23	25 24	26 54	25 52	27 25	26 20	27 55	26 48	28 26	27 17	28 56	27 45	29 27	28 13	29 57
56	24 54	26 24	25 22	26 55	25 50	27 25	26 18	27 56	26 47	28 26	27 15	28 57	27 43	29 27	28 11	29 58
58	24 52	26 24	25 20	26 55	25 48	27 26	26 17	27 56	26 45	28 27	27 13	28 57	27 41	29 28	28 10	29 58

Seconds of H. P.		
″	Cor	A
	″	″
1	0	1
2	1	1
3	1	2
4	2	2
5	2	3
6	3	3
7	3	4
8	4	4
9	4	5
10	5	5
11	5	6
12	6	6
13	6	7
14	7	7
15	7	8
16	8	8
17	8	9
18	9	9
19	9	10
20	10	10
21	10	11
22	11	11
23	11	12
24	12	12
25	12	13
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36	17	18
37	18	19
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41	20	21
42	20	21
43	21	22
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47	23	24
48	23	24
49	24	25
50	24	25
51	25	26
52	25	26
53	26	27
54	26	27
55	27	28
56	27	28
57	28	29
58	28	29
59	28	30
App. Alt.	☉	✱
	A	A
3	8	8
4	6	5
5	4	4
6	3	3
7	3	2
8	2	2
9	2	1
10	2	1
20	2	0
30	3	0
40	3	0
50	4	0
60	4	0
70	5	0
90	5	0

(62° and 63°) Correction of the Moon's Altitude, and the Aux. Angle A.

App. Alt.	Minutes of Moon's Hor. Parallax. 54′		55′		56′		57′		58′		59′		60′		61′	
62°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
0′	21 50	26 25	25 19	26 56	25 47	27 26	26 15	27 57	26 43	28 27	27 11	28 58	27 39	29 28	28 8	29 50
2	24 49	26 25	25 17	26 56	25 45	27 27	26 13	27 57	26 41	28 28	27 10	28 58	27 38	29 29	23 6	30 0
4	24 47	26 26	25 15	26 57	25 43	27 27	26 12	27 58	26 40	28 28	27 8	28 59	27 36	29 29	28 4	30 0
6	24 46	26 26	25 14	26 57	25 42	27 28	26 10	27 58	26 38	28 29	27 6	29 0	27 34	29 30	28 2	30 1
8	24 44	26 27	25 12	26 58	25 40	27 28	26 8	27 59	26 36	28 29	27 4	29 0	27 32	29 31	28 0	30 1
10	24 42	26 27	25 10	26 58	25 38	27 29	26 6	27 59	26 34	28 30	27 2	29 1	27 30	29 31	27 58	30 2
12	24 41	26 28	25 9	26 59	25 37	27 29	26 5	28 0	26 33	28 30	27 1	29 1	27 29	29 32	27 57	30 2
14	24 39	26 28	25 7	26 59	25 35	27 30	26 3	28 0	26 31	28 31	26 59	29 2	27 27	29 32	27 55	30 3
16	24 37	26 29	25 5	27 0	25 33	27 30	26 1	28 1	26 29	28 32	26 57	29 2	27 25	29 33	27 53	30 3
18	24 36	26 29	25 4	27 0	25 32	27 31	26 0	28 1	26 27	28 32	26 55	29 3	27 23	29 33	27 51	30 4
20	24 34	26 30	25 2	27 1	25 30	27 31	25 58	28 2	26 26	28 33	26 54	29 3	27 21	29 34	27 49	30 5
22	24 33	26 30	25 0	27 1	25 28	27 32	25 56	28 2	26 24	28 33	26 52	29 4	27 20	29 34	27 47	30 5
24	24 31	26 31	24 59	27 2	25 27	27 32	25 54	28 3	26 22	28 34	26 50	29 4	27 18	29 35	27 46	30 6
26	24 29	26 31	24 57	27 2	25 25	27 33	25 53	28 3	26 20	28 34	26 48	29 5	27 16	29 36	27 44	30 6
28	24 28	26 32	24 55	27 3	25 23	27 33	25 51	28 4	26 19	28 35	26 46	29 5	27 14	29 36	27 42	30 7
30	24 26	26 32	24 54	27 3	25 21	27 34	25 49	28 4	26 17	28 35	26 45	29 6	27 12	29 37	27 40	30 7
32	24 24	26 33	24 52	27 4	25 20	27 34	25 47	28 5	26 15	28 36	26 43	29 6	27 10	29 37	27 38	30 8
34	24 23	26 33	24 50	27 4	25 18	27 35	25 46	28 5	26 13	28 36	26 41	29 7	27 9	29 38	27 36	30 9
36	24 21	26 34	24 49	27 5	25 16	27 35	25 44	28 6	26 12	28 37	26 39	29 8	27 7	29 38	27 34	30 9
38	24 20	26 34	24 47	27 5	25 15	27 36	25 42	28 7	26 10	28 37	26 37	29 8	27 5	29 39	27 33	30 10
40	24 18	26 35	24 45	27 6	25 13	27 36	25 41	28 7	26 8	28 38	26 36	29 9	27 3	29 39	27 31	30 10
42	24 16	26 35	24 44	27 6	25 11	27 37	25 39	28 8	26 6	28 38	26 34	29 9	27 1	29 40	27 29	30 11
44	24 15	26 36	24 42	27 7	25 10	27 37	25 37	28 8	26 5	28 39	26 32	29 10	27 0	29 40	27 27	30 11
46	24 13	26 36	24 41	27 7	25 8	27 38	25 35	28 9	26 3	28 39	26 30	29 10	26 58	29 41	27 25	30 12
48	24 11	26 37	24 39	27 8	25 6	27 38	25 34	28 9	26 1	28 40	26 29	29 11	26 56	29 42	27 23	30 12
50	24 10	26 37	24 37	27 8	25 5	27 39	25 32	28 10	25 59	28 41	26 27	29 11	26 54	29 42	27 22	30 13
52	24 8	26 38	24 36	27 9	25 3	27 39	25 30	28 10	25 58	28 41	26 25	29 12	26 52	29 43	27 20	30 14
54	24 6	26 38	24 34	27 9	25 0	27 40	25 29	28 11	25 56	28 42	26 23	29 12	26 51	29 43	27 18	30 14
56	24 5	26 39	24 32	27 10	24 59	27 40	25 27	28 11	25 54	28 42	26 21	29 13	26 49	29 44	27 16	30 15
58	24 3	26 39	24 31	27 10	24 58	27 41	25 25	28 12	25 52	28 43	26 20	29 13	26 47	29 44	27 14	30 15
63°	54′		55′		56′		57′		58′		59′		60′		61′	
0′	24 2	26 40	24 29	27 11	24 56	27 41	25 23	28 12	25 51	28 43	26 18	29 14	26 45	29 45	27 12	30 16
2	24 0	26 40	24 27	27 11	24 54	27 42	25 22	28 13	25 49	28 44	26 16	29 15	26 43	29 45	27 11	30 16
4	23 58	26 41	24 26	27 12	24 53	27 42	25 20	28 13	25 47	28 44	26 14	29 15	26 41	29 46	27 9	30 17
6	23 57	26 41	24 24	27 12	24 51	27 43	25 18	28 14	25 45	28 45	26 13	29 16	26 40	29 47	27 7	30 17
8	23 55	26 42	24 22	27 13	24 49	27 43	25 16	28 14	25 44	28 45	26 11	29 16	26 38	29 47	27 5	30 18
10	23 53	26 42	24 20	27 13	24 48	27 44	25 15	28 15	25 42	28 46	26 9	29 17	26 36	29 48	27 3	30 18
12	23 52	26 43	24 19	27 14	24 46	27 44	25 13	28 15	25 40	28 46	26 7	29 17	26 34	29 48	27 1	30 19
14	23 50	26 43	24 17	27 14	24 44	27 45	25 11	28 16	25 38	28 47	26 5	29 18	26 32	29 49	26 59	30 20
16	23 48	26 44	24 15	27 15	24 42	27 45	25 9	28 16	25 37	28 47	26 4	29 18	26 31	29 49	26 58	30 20
18	23 47	26 44	24 14	27 15	24 41	27 46	25 8	28 17	25 35	28 48	26 2	29 19	26 29	29 50	26 56	30 21
20	23 45	26 44	24 12	27 15	24 39	27 46	25 6	28 17	25 33	28 48	26 0	29 19	26 27	29 50	26 54	30 21
22	23 44	26 45	24 10	27 16	24 37	27 47	25 4	28 18	25 31	28 49	25 58	29 20	26 25	29 51	26 52	30 22
24	23 42	26 45	24 9	27 16	24 36	27 47	25 3	28 18	25 29	28 49	25 56	29 20	26 23	29 51	26 50	30 22
26	23 40	26 46	24 7	27 17	24 34	27 48	25 1	28 19	25 28	28 50	25 55	29 21	26 21	29 52	26 48	30 23
28	23 39	26 46	24 5	27 17	24 32	27 48	24 59	28 19	25 26	28 50	25 53	29 21	26 20	29 52	26 46	30 23
30	23 37	26 47	24 4	27 18	24 30	27 49	24 57	28 20	25 24	28 51	25 51	29 22	26 18	29 53	26 44	30 24
32	23 35	26 47	24 2	27 18	24 29	27 49	24 56	28 20	25 22	28 51	25 49	29 22	26 16	29 53	26 43	30 24
34	23 34	26 48	24 0	27 19	24 27	27 50	24 54	28 21	25 21	28 52	25 47	29 23	26 14	29 54	26 41	30 25
36	23 32	26 48	23 59	27 19	24 25	27 50	24 52	28 21	25 19	28 52	25 45	29 23	26 12	29 54	26 39	30 25
38	23 30	26 49	23 57	27 20	24 24	27 51	24 50	28 22	25 17	28 53	25 44	29 24	26 10	29 55	26 37	30 26
40	23 29	26 49	23 55	27 20	24 22	27 51	24 49	28 22	25 15	28 53	25 42	29 24	26 8	29 55	26 35	30 26
42	23 27	26 50	23 54	27 21	24 20	27 52	24 47	28 23	25 13	28 54	25 40	29 25	26 7	29 56	26 33	30 27
44	23 25	26 50	23 52	27 21	24 18	27 52	24 45	28 23	25 12	28 54	25 38	29 25	26 4	29 57	26 31	30 28
46	23 24	26 51	23 50	27 22	24 17	27 53	24 43	28 24	25 10	28 55	25 36	29 26	26 3	29 57	26 30	30 28
48	23 22	26 51	23 49	27 22	24 15	27 53	24 42	28 24	25 8	28 55	25 35	29 26	26 1	29 58	26 28	30 29
50	23 20	26 52	23 47	27 23	24 13	27 54	24 40	28 25	25 6	28 56	25 33	29 27	25 59	29 58	26 26	30 29
52	23 19	26 52	23 45	27 23	24 12	27 54	24 38	28 25	25 5	28 56	25 31	29 28	25 57	29 59	26 24	30 30
54	23 17	26 53	23 44	27 24	24 10	27 55	24 36	28 26	25 3	28 57	25 29	29 28	25 56	29 59	26 22	30 30
56	23 16	26 53	23 42	27 24	24 8	27 55	24 35	28 26	25 1	28 57	25 27	29 29	25 54	30 0	26 20	30 31
58	23 14	26 54	23 40	27 25	24 6	27 56	24 33	28 27	24 59	28 58	25 26	29 29	25 52	30 1	26 18	30 31

Seconds of H. P.

″	Cor ″	A ″
1	0	1
2	1	1
3	1	2
4	2	2
5	2	3
6	3	3
7	3	4
8	4	4
9	4	5
10	4	5
11	5	6
12	5	6
13	6	7
14	6	7
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29	13	15
30	13	15
31	14	16
32	14	16
33	15	17
34	15	17
35	16	18
36	16	18
37	17	19
38	17	19
39	18	20
40	18	20
41	18	21
42	19	21
43	19	22
44	20	22
45	20	23
46	21	23
47	21	24
48	22	24
49	22	25
50	22	25
51	23	26
52	23	26
53	24	27
54	24	27
55	25	28
56	25	28
57	26	29
58	26	29
59	27	30

App. Alt.	☉	☆
	A	A
3	8	8
4	6	5
5	4	4
6	3	3
7	3	2
8	2	2
9	2	1
10	2	1
20	2	0
30	3	0
40	3	0
50	4	0
60	4	0
70	5	0
80	5	0

Correction of the Moon's Altitude, and the Aux. Angle A. (64° and 65°)

App. Alt.	Minutes of Moon's Hor. Parallax. 54′		55′		56′		57′		58′		59′		60′		61′	
64°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr +	A 60°	Corr. +	A 60°	Corr. +	A 60°
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
0′	23 12	26 54	23 39	27 25	24 5	27 56	24 31	28 27	24 57	28 58	25 24	29 30	25 50	30 1	26 16	30 32
2	23 11	26 55	23 37	27 26	24 3	27 57	24 29	28 28	24 56	28 59	25 22	29 30	25 48	30 1	26 15	30 32
4	23 9	26 55	23 35	27 26	24 1	27 57	24 28	28 28	24 54	28 59	25 20	29 31	25 46	30 2	26 13	30 33
6	23 7	26 55	23 34	27 27	24 0	27 58	24 26	28 29	24 52	29 0	25 18	29 31	25 45	30 2	26 11	30 33
8	23 6	26 56	23 32	27 27	23 58	27 58	24 24	28 29	24 50	29 0	25 17	29 32	25 43	30 3	26 9	30 34
10	23 4	26 56	23 30	27 28	23 56	27 59	24 22	28 30	24 49	29 1	25 15	29 32	25 41	30 3	26 7	30 34
12	23 2	26 57	23 28	27 28	23 55	27 59	24 21	28 30	24 47	29 1	25 13	29 33	25 39	30 4	26 5	30 35
14	23 1	26 57	23 27	27 28	23 53	28 0	24 19	28 31	24 45	29 2	25 11	29 33	25 37	30 4	26 3	30 36
16	22 59	26 58	23 25	27 29	23 51	28 0	24 17	28 31	24 43	29 2	25 9	29 34	25 35	30 5	26 0	30 36
18	22 58	26 58	23 23	27 29	23 49	28 1	24 15	28 32	24 41	29 3	25 7	29 34	25 33	30 5	25 59	30 37
20	22 56	26 59	23 22	27 30	23 48	28 1	24 14	28 32	24 40	29 3	25 6	29 35	25 32	30 6	25 58	30 37
22	22 54	26 59	23 20	27 30	23 46	28 2	24 12	28 33	24 38	29 4	25 4	29 35	25 30	30 6	25 56	30 38
24	22 52	27 0	23 18	27 31	23 44	28 2	24 10	28 33	24 36	29 5	25 2	29 36	25 28	30 7	25 54	30 38
26	22 51	27 0	23 17	27 31	23 43	28 3	24 8	28 34	24 34	29 5	25 0	29 36	25 26	30 7	25 52	30 39
28	22 49	27 1	23 15	27 32	23 41	28 3	24 7	28 34	24 32	29 6	24 58	29 37	25 24	30 8	25 50	30 39
30	22 47	27 1	23 13	27 32	23 39	28 4	24 5	28 35	24 31	29 6	24 57	29 37	25 22	30 8	25 48	30 40
32	22 46	27 2	23 12	27 33	23 37	28 4	24 3	28 35	24 29	29 7	24 55	29 38	25 20	30 9	25 46	30 40
34	22 44	27 2	23 10	27 33	23 36	28 5	24 1	28 36	24 27	29 7	24 53	29 38	25 19	30 10	25 44	30 41
36	22 42	27 3	23 8	27 34	23 34	28 5	24 0	28 36	24 25	29 8	24 51	29 39	25 17	30 10	25 43	30 41
38	22 41	27 3	23 6	27 34	23 32	28 6	23 58	28 37	24 24	29 8	24 49	29 39	25 15	30 11	25 41	30 42
40	22 39	27 4	23 5	27 35	23 30	28 6	23 56	28 37	24 22	29 9	24 47	29 40	25 13	30 11	25 39	30 42
42	22 37	27 4	23 3	27 35	23 29	28 7	23 54	28 38	24 20	29 9	24 46	29 40	25 11	30 12	25 37	30 43
44	22 36	27 4	23 1	27 36	23 27	28 7	23 53	28 38	24 18	29 10	24 44	29 41	25 9	30 12	25 35	30 43
46	22 34	27 5	23 0	27 36	23 25	28 7	23 51	28 39	24 16	29 10	24 42	29 41	25 8	30 13	25 33	30 44
48	22 32	27 5	22 58	27 37	23 24	28 8	23 49	28 39	24 15	29 11	24 40	29 42	25 6	30 13	25 31	30 44
50	22 31	27 6	22 56	27 37	23 22	28 8	23 47	28 40	24 13	29 11	24 38	29 42	25 4	30 14	25 29	30 45
52	22 29	27 6	22 55	27 38	23 20	28 9	23 46	28 40	24 11	29 12	24 37	29 43	25 2	30 14	25 28	30 46
54	22 27	27 7	22 53	27 38	23 18	28 9	23 44	28 41	24 9	29 12	24 35	29 43	25 0	30 15	25 26	30 46
56	22 26	27 7	22 51	27 38	23 17	28 10	23 42	28 41	24 7	29 13	24 33	29 44	24 58	30 15	25 24	30 47
58	22 24	27 8	22 50	27 39	23 15	28 10	23 40	28 42	24 6	29 13	24 31	29 44	24 56	30 16	25 22	30 47
65°	54′		55′		56′		57′		58′		59′		60′		61′	
0′	22 22	27 8	22 48	27 39	23 13	28 11	23 39	28 42	24 4	29 13	24 29	29 45	24 55	30 16	25 20	30 48
2	22 21	27 8	22 46	27 40	23 11	28 11	23 37	28 43	24 2	29 14	24 27	29 45	24 53	30 17	25 18	30 48
4	22 19	27 9	22 44	27 40	23 10	28 12	23 35	28 43	24 0	29 14	24 26	29 46	24 51	30 17	25 16	30 49
6	22 17	27 9	22 43	27 41	23 8	28 12	23 33	28 44	23 58	29 15	24 24	29 46	24 49	30 18	25 14	30 49
8	22 16	27 10	22 41	27 41	23 6	28 13	23 31	28 44	23 57	29 15	24 22	29 47	24 47	30 18	25 12	30 50
10	22 14	27 10	22 39	27 42	23 4	28 13	23 30	28 44	23 55	29 16	24 20	29 47	24 45	30 19	25 10	30 50
12	22 12	27 11	22 38	27 42	23 3	28 13	23 28	28 45	23 53	29 16	24 18	29 48	24 43	30 19	25 9	30 51
14	22 11	27 11	22 36	27 43	23 1	28 14	23 26	28 45	23 51	29 17	24 16	29 48	24 42	30 20	25 7	30 51
16	22 9	27 12	22 34	27 43	22 59	28 14	23 24	28 46	23 49	29 17	24 15	29 49	24 40	30 20	25 5	30 52
18	22 7	27 12	22 32	27 43	22 58	28 15	23 23	28 46	23 48	29 18	24 13	29 49	24 38	30 21	25 3	30 52
20	22 6	27 13	22 31	27 44	22 56	28 15	23 21	28 47	23 46	29 18	24 11	29 50	24 36	30 21	25 1	30 53
22	22 4	27 13	22 29	27 44	22 54	28 16	23 19	28 47	23 44	29 19	24 9	29 50	24 34	30 22	24 59	30 53
24	22 2	27 13	22 27	27 45	22 52	28 16	23 17	28 48	23 42	29 19	24 7	29 51	24 32	30 22	24 57	30 54
26	22 1	27 14	22 26	27 45	22 51	28 17	23 16	28 48	23 41	29 20	24 5	29 51	24 30	30 23	24 55	30 54
28	21 59	27 14	22 24	27 46	22 49	28 17	23 14	28 49	23 39	29 20	24 4	29 52	24 29	30 23	24 53	30 55
30	21 57	27 15	22 22	27 46	22 47	28 18	23 12	28 49	23 37	29 21	24 2	29 52	24 27	30 24	24 52	30 55
32	21 56	27 15	22 20	27 47	22 45	28 18	23 10	28 50	23 35	29 21	24 0	29 53	24 25	30 24	24 50	30 56
34	21 54	27 16	22 19	27 47	22 44	28 19	23 8	28 50	23 33	29 22	23 58	29 53	24 23	30 25	24 48	30 56
36	21 52	27 16	22 17	27 47	22 42	28 19	23 7	28 51	23 32	29 22	23 56	29 54	24 21	30 25	24 46	30 57
38	21 51	27 16	22 15	27 48	22 40	28 20	23 5	28 51	23 30	29 23	23 54	29 54	24 19	30 26	24 44	30 57
40	21 49	27 17	22 14	27 48	22 38	28 20	23 3	28 51	23 28	29 23	23 53	29 54	24 17	30 26	24 42	30 58
42	21 47	27 17	22 12	27 49	22 37	28 20	23 1	28 52	23 26	29 23	23 51	29 55	24 16	30 27	24 40	30 58
44	21 46	27 18	22 10	27 49	22 35	28 21	23 0	28 52	23 24	29 24	23 49	29 55	24 14	30 27	24 38	30 59
46	21 44	27 18	22 9	27 50	22 33	28 21	22 58	28 53	23 23	29 24	23 47	29 56	24 12	30 28	24 36	30 59
48	21 42	27 19	22 7	27 50	22 32	28 22	22 56	28 53	23 21	29 25	23 45	29 56	24 10	30 28	24 35	31 0
50	21 41	27 19	22 5	27 51	22 30	28 22	22 54	28 54	23 19	29 25	23 43	29 57	24 8	30 28	24 33	31 0
52	21 39	27 20	22 3	27 51	22 28	28 23	22 53	28 54	23 17	29 26	23 42	29 57	24 6	30 29	24 31	31 1
54	21 37	27 20	22 2	27 52	22 26	28 23	22 51	28 55	23 15	29 26	23 40	29 58	24 4	30 29	24 29	31 1
56	21 36	27 20	22 0	27 52	22 25	28 24	22 49	28 55	23 14	29 27	23 38	29 58	24 2	30 30	24 27	31 2
58	21 34	27 21	21 58	27 52	22 23	28 24	22 47	28 56	23 12	29 27	23 36	29 59	24 1	30 30	24 25	31 2

Seconds of H. P.

″	Cor ″	A ″
1	0	1
2	1	1
3	1	2
4	2	2
5	2	3
6	3	3
7	3	4
8	3	4
9	4	5
10	4	5
11	5	6
12	5	6
13	5	7
14	3	7
15	6	8
16	7	8
17	7	9
18	8	9
19	8	10
20	8	10
21	9	11
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23	10	12
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25	11	13
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29	12	15
30	13	16
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36	15	19
37	16	19
38	16	20
39	17	20
40	17	21
41	17	21
42	18	22
43	18	22
44	19	23
45	19	23
46	20	24
47	20	24
48	20	25
49	21	25
50	21	26
51	22	26
52	22	27
53	23	27
54	23	28
55	23	28
56	24	29
57	24	30
58	24	30
59	25	31

Alt.	☽ A	⊙ A	✱ A
°	′	′	′
3	8	8	8
4	6	6	5
5	4	4	4
6	3	3	3
7	3	2	2
8	2	2	2
9	2	1	1
10	2	1	1
20	2	0	0
30	3	0	0
40	3	0	0
50	4	0	0
60	4	0	0
70	5	0	0
90	5	0	0

(66° and 67°) Correction of the Moon's Altitude, and the Aux. Angle A.

App. Alt.	Minutes of Moon's Hor. Parallax. 54′		55′		56′		57′		58′		59′		60′		61′	
66°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
0′	21 32	27 21	21 57	27 53	22 21	28 24	22 45	28 56	23 10	29 28	23 34	29 59	23 59	30 31	24 23	31 3
2	21 31	27 22	21 55	27 53	22 19	28 25	22 44	28 57	23 8	29 28	23 32	30 0	23 57	30 31	24 21	31 3
4	21 29	27 22	21 53	27 54	22 18	28 25	22 42	28 57	23 6	29 29	23 31	30 0	23 55	30 32	24 19	31 4
6	21 27	27 23	21 52	27 54	22 16	28 26	22 40	28 57	23 4	29 29	23 29	30 1	23 53	30 32	24 17	31 4
8	21 26	27 23	21 50	27 55	22 14	28 26	22 38	28 58	23 3	29 30	23 27	30 1	23 51	30 33	24 16	31 5
10	21 24	27 23	21 48	27 55	22 12	28 27	22 37	28 58	23 1	29 30	23 25	30 2	23 49	30 33	24 14	31 5
12	21 22	27 24	21 46	27 56	22 11	28 27	22 35	28 59	22 59	29 30	23 23	30 2	23 47	30 34	24 12	31 5
14	21 20	27 24	21 45	27 56	22 9	28 28	22 33	28 59	22 57	29 31	23 21	30 3	23 46	30 34	24 10	31 6
16	21 19	27 25	21 43	27 56	22 7	28 28	22 31	29 0	22 55	29 31	23 19	30 3	23 44	30 35	24 8	31 6
18	21 17	27 25	21 41	27 57	22 5	28 28	22 29	29 0	22 54	29 32	23 18	30 4	23 42	30 35	24 6	31 7
20	21 15	27 25	21 39	27 57	22 4	28 29	22 28	29 1	22 52	29 32	23 16	30 4	23 40	30 36	24 4	31 7
22	21 14	27 26	21 38	27 58	22 2	28 29	22 26	29 1	22 50	29 33	23 14	30 4	23 38	30 36	24 2	31 8
24	21 12	27 26	21 36	27 58	22 0	28 30	22 24	29 1	22 48	29 33	23 12	30 5	23 36	30 37	24 0	31 8
26	21 10	27 27	21 34	27 59	21 58	28 30	22 22	29 2	22 46	29 34	23 10	30 5	23 34	30 37	23 58	31 9
28	21 9	27 27	21 33	27 59	21 57	28 31	22 21	29 2	22 44	29 34	23 8	30 6	23 32	30 38	23 56	31 9
30	21 7	27 28	21 31	27 59	21 55	28 31	22 19	29 3	22 43	29 35	23 7	30 6	23 30	30 38	23 54	31 10
32	21 5	27 28	21 29	28 0	21 53	28 32	22 17	29 3	22 41	29 35	23 5	30 7	23 29	30 38	23 53	31 10
34	21 4	27 29	21 27	28 0	21 51	28 32	22 15	29 4	22 39	29 35	23 3	30 7	23 27	30 39	23 51	31 11
36	21 2	27 29	21 26	28 1	21 50	28 32	22 13	29 4	22 37	29 36	23 1	30 8	23 25	30 39	23 49	31 11
38	21 0	27 29	21 24	28 1	21 48	28 33	22 12	29 5	22 35	29 36	22 59	30 8	23 23	30 40	23 47	31 12
40	20 58	27 30	21 22	28 2	21 46	28 33	22 10	29 5	22 34	29 37	22 57	30 9	23 21	30 40	23 45	31 12
42	20 57	27 30	21 21	28 2	21 44	28 34	22 8	29 6	22 32	29 37	22 55	30 9	23 19	30 41	23 43	31 13
44	20 55	27 31	21 19	28 2	21 43	28 34	22 6	29 6	22 30	29 38	22 54	30 10	23 17	30 41	23 41	31 13
46	20 53	27 31	21 17	28 3	21 41	28 35	22 4	29 6	22 28	29 38	22 52	30 10	23 16	30 42	23 39	31 14
48	20 52	27 31	21 15	28 3	21 39	28 35	22 3	29 7	22 26	29 39	22 50	30 10	23 14	30 42	23 37	31 14
50	20 50	27 32	21 14	28 4	21 37	28 35	22 1	29 7	22 25	29 39	22 48	30 11	23 12	30 43	23 35	31 14
52	20 48	27 32	21 12	28 4	21 36	28 36	21 59	29 8	22 23	29 40	22 46	30 11	23 10	30 43	23 33	31 15
54	20 47	27 33	21 10	28 5	21 34	28 36	21 57	29 8	22 21	29 40	22 44	30 12	23 8	30 44	23 32	31 15
56	20 45	27 33	21 9	28 5	21 32	28 37	21 56	29 9	22 19	29 40	22 43	30 12	23 6	30 44	23 30	31 16
58	20 43	27 34	21 7	28 5	21 30	28 37	21 54	29 9	22 17	29 41	22 41	30 13	23 4	30 45	23 28	31 16

67°	54′		55′		56′		57′		58′		59′		60′		61′	
0′	20 42	27 34	21 5	28 6	21 29	28 38	21 52	29 9	22 15	29 41	22 39	30 13	23 2	30 45	23 26	31 17
2	20 40	27 34	21 3	28 6	21 27	28 38	21 50	29 10	22 14	29 42	22 37	30 14	23 1	30 46	23 24	31 17
4	20 38	27 35	21 2	28 7	21 25	28 39	21 49	29 10	22 12	29 42	22 35	30 14	22 59	30 46	23 22	31 18
6	20 36	27 35	21 0	28 7	21 23	28 39	21 47	29 11	22 10	29 43	22 33	30 15	22 57	30 46	23 20	31 18
8	20 35	27 36	20 58	28 7	21 22	28 39	21 45	29 11	22 8	29 43	22 31	30 15	22 55	30 47	23 18	31 19
10	20 33	27 36	20 56	28 8	21 20	28 40	21 43	29 12	22 6	29 44	22 30	30 15	22 53	30 47	23 16	31 19
12	20 31	27 36	20 55	28 8	21 18	28 40	21 42	29 12	22 4	29 44	22 28	30 16	22 51	30 48	23 14	31 20
14	20 30	27 37	20 53	28 9	21 16	28 41	21 40	29 13	22 3	29 44	22 26	30 16	22 49	30 48	23 12	31 20
16	20 28	27 37	20 51	28 9	21 14	28 41	21 38	29 13	22 1	29 45	22 24	30 17	22 47	30 49	23 10	31 21
18	20 26	27 38	20 49	28 10	21 13	28 41	21 37	29 13	21 59	29 45	22 22	30 17	22 45	30 49	23 8	31 21
20	20 25	27 38	20 48	28 10	21 11	28 42	21 35	29 14	21 57	29 46	22 20	30 18	22 43	30 49	23 6	31 21
22	20 23	27 39	20 46	28 10	21 9	28 42	21 33	29 14	21 55	29 46	22 18	30 18	22 41	30 50	23 5	31 22
24	20 21	27 39	20 44	28 11	21 7	28 43	21 31	29 15	21 53	29 47	22 16	30 19	22 40	30 50	23 3	31 22
26	20 19	27 39	20 43	28 11	21 6	28 43	21 29	29 15	21 52	29 47	22 15	30 19	22 38	30 51	23 1	31 23
28	20 18	27 40	20 41	28 12	21 4	28 44	21 27	29 16	21 50	29 47	22 13	30 19	22 36	30 51	22 59	31 23
30	20 16	27 40	20 39	28 12	21 2	28 44	21 25	29 16	21 48	29 48	22 11	30 20	22 34	30 52	22 57	31 24
32	20 14	27 41	20 37	28 13	21 0	28 44	21 24	29 16	21 46	29 48	22 9	30 20	22 32	30 52	22 55	31 24
34	20 13	27 41	20 36	28 13	20 59	28 45	21 22	29 17	21 44	29 49	22 7	30 21	22 30	30 53	22 53	31 25
36	20 11	27 41	20 34	28 13	20 57	28 45	21 20	29 17	21 42	29 49	22 5	30 21	22 28	30 53	22 51	31 25
38	20 9	27 42	20 32	28 14	20 55	28 46	21 18	29 18	21 41	29 50	22 3	30 22	22 26	30 54	22 49	31 26
40	20 8	27 42	20 30	28 14	20 53	28 46	21 16	29 18	21 39	29 50	22 2	30 22	22 24	30 54	22 47	31 26
42	20 6	27 43	20 29	28 15	20 51	28 47	21 14	29 19	21 37	29 51	22 0	30 23	22 23	30 55	22 45	31 27
44	20 4	27 43	20 27	28 15	20 50	28 47	21 12	29 19	21 35	29 51	21 58	30 23	22 21	30 55	22 43	31 27
46	20 2	27 43	20 25	28 15	20 48	28 47	21 11	29 20	21 33	29 52	21 56	30 24	22 19	30 56	22 42	31 28
48	20 1	27 44	20 23	28 16	20 46	28 48	21 9	29 20	21 31	29 52	21 54	30 24	22 17	30 56	22 40	31 28
50	19 59	27 44	20 22	28 16	20 44	28 48	21 7	29 20	21 30	29 52	21 52	30 24	22 15	30 56	22 38	31 28
52	19 57	27 45	20 20	28 17	20 43	28 49	21 5	29 21	21 28	29 53	21 50	30 25	22 13	30 57	22 36	31 29
54	19 56	27 45	20 18	28 17	20 41	28 49	21 3	29 21	21 26	29 53	21 49	30 25	22 11	30 57	22 34	31 29
56	19 54	27 46	20 17	28 18	20 39	28 50	21 2	29 22	21 24	29 54	21 47	30 26	22 9	30 58	22 32	31 30
58	19 52	27 46	20 15	28 18	20 37	28 50	21 0	29 22	21 22	29 54	21 45	30 26	22 7	30 58	22 30	31 30

Seconds of H. P.		
″	Cor.	A
	″	″
1	0	1
2	1	1
3	1	2
4	2	2
5	2	3
6	2	3
7	3	4
8	3	4
9	4	5
10	4	5
11	4	6
12	5	6
13	5	7
14	5	7
15	6	8
16	6	9
17	7	9
18	7	10
19	7	10
20	8	11
21	8	11
22	9	12
23	9	12
24	9	13
25	10	13
26	10	14
27	11	14
28	11	15
29	11	15
30	12	16
31	12	17
32	13	17
33	13	18
34	13	18
35	14	19
36	14	19
37	14	20
38	15	20
39	15	21
40	16	21
41	16	22
42	16	22
43	17	23
44	17	23
45	18	24
46	18	25
47	18	25
48	19	26
49	19	26
50	20	27
51	20	27
52	20	28
53	21	28
54	21	29
55	22	29
56	22	30
57	22	30
58	23	31
59	23	31
=	=	=
Alt.	A ☉	A ●
3	8	8
4	6	5
5	4	4
6	3	3
7	3	2
8	2	2
9	2	1
10	2	1
20	2	0
30	3	0
40	3	0
50	4	0
60	4	0
70	5	0
90	5	0

Correction of the Moon's Altitude, and the Aux. Angle A. (68° and 69°)

App Alt.	Minutes of Moon's Hor. Parallax. 54′		55′		56′		57′		58′		59′		60′		61′		Seconds of H. P.		
68°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	″	δ	A
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″		°	″
0′	19 51	27 46	20 13	28 18	20 36	28 50	20 58	29 23	21 20	29 55	21 43	30 27	22 5	30 59	22 28	31 31	1	0	1
2	19 49	27 47	20 11	28 19	20 34	28 51	20 56	29 23	21 19	29 55	21 41	30 27	22 4	30 59	22 26	31 31	2	1	1
4	19 47	27 47	20 10	28 19	20 32	28 51	20 54	29 23	21 17	29 55	21 39	30 28	22 2	31 0	22 24	31 32	3	1	2
6	19 45	27 48	20 8	28 20	20 30	28 52	20 53	29 24	21 15	29 56	21 37	30 28	22 0	31 0	22 22	31 32	4	2	2
8	19 44	27 48	20 6	28 20	20 28	28 52	20 51	29 24	21 13	29 56	21 35	30 28	21 58	31 0	22 20	31 33	5	2	3
10	19 42	27 48	20 4	28 20	20 27	28 53	20 49	29 25	21 11	29 57	21 34	30 29	21 56	31 1	22 18	31 33	6	3	4
12	19 40	27 49	20 3	28 21	20 25	28 53	20 47	29 25	21 9	29 57	21 32	30 29	21 54	31 1	22 16	31 33	7	3	4
14	19 39	27 49	20 1	28 21	20 23	28 53	20 45	29 25	21 8	29 58	21 30	30 30	21 52	31 2	22 14	31 34	8	3	4
16	19 37	27 50	19 59	28 22	20 21	28 54	20 44	29 26	21 6	29 58	21 28	30 30	21 50	31 2	22 12	31 34	9	3	5
18	19 35	27 50	19 57	28 22	20 19	28 54	20 42	29 26	21 4	29 58	21 26	30 30	21 48	31 3	22 10	31 35	10	4	5
20	19 33	27 50	19 56	28 22	20 18	28 55	20 40	29 27	21 2	29 59	21 24	30 31	21 46	31 3	22 8	31 35	11	4	6
22	19 32	27 51	19 54	28 23	20 16	28 55	20 38	29 27	21 0	29 59	21 22	30 31	21 44	31 4	22 7	31 36	12	4	6
24	19 30	27 51	19 52	28 23	20 14	28 55	20 36	29 28	20 58	30 0	21 20	30 32	21 42	31 4	22 5	31 36	13	5	7
26	19 28	27 51	19 50	28 24	20 12	28 56	20 34	29 28	20 56	30 0	21 19	30 32	21 41	31 4	22 3	31 36	14	5	8
28	19 27	27 52	19 49	28 24	20 11	28 56	20 33	29 28	20 55	30 0	21 17	30 33	21 39	31 5	22 1	31 37	15	5	8
30	19 25	27 52	19 47	28 24	20 9	28 57	20 31	29 29	20 53	30 1	21 15	30 33	21 37	31 5	21 59	31 37	16	6	9
32	19 23	27 53	19 45	28 25	20 7	28 57	20 29	29 29	20 51	30 1	21 13	30 33	21 35	31 6	21 57	31 38	17	6	9
34	19 21	27 53	19 43	28 25	20 5	28 57	20 27	29 30	20 49	30 2	21 11	30 34	21 33	31 6	21 55	31 38	18	6	10
36	19 20	27 53	19 42	28 26	20 3	28 58	20 25	29 30	20 47	30 2	21 9	30 34	21 31	31 6	21 53	31 39	19	7	10
38	19 18	27 54	19 40	28 26	20 2	28 58	20 24	29 30	20 45	30 2	21 7	30 35	21 29	31 7	21 51	31 39	20	7	11
40	19 16	27 54	19 38	28 26	20 0	28 59	20 22	29 31	20 44	30 3	21 5	30 35	21 27	31 7	21 49	31 39	21	8	11
42	19 15	27 55	19 36	28 27	19 58	28 59	20 20	29 31	20 42	30 3	21 4	30 36	21 25	31 8	21 47	31 40	22	8	12
44	19 13	27 55	19 35	28 27	19 56	28 59	20 18	29 32	20 40	30 4	21 2	30 36	21 23	31 8	21 45	31 40	23	8	12
46	19 11	27 55	19 33	28 28	19 55	29 0	20 16	29 32	20 38	30 4	21 0	30 36	21 22	31 9	21 43	31 41	24	9	13
48	19 9	27 56	19 31	28 28	19 53	29 0	20 15	29 32	20 36	30 5	20 58	30 37	21 20	31 9	21 41	31 41	25	9	14
50	19 8	27 56	19 29	28 28	19 51	29 1	20 13	29 33	20 34	30 5	20 56	30 37	21 18	31 9	21 39	31 42	26	9	14
52	19 6	27 57	19 28	28 29	19 49	29 1	20 11	29 33	20 32	30 5	20 54	30 38	21 16	31 10	21 37	31 42	27	10	15
54	19 4	27 57	19 26	28 29	19 47	29 1	20 9	29 34	20 31	30 6	20 52	30 38	21 14	31 10	21 35	31 43	28	10	15
56	19 3	27 57	19 24	28 30	19 46	29 2	20 7	29 34	20 29	30 6	20 50	30 39	21 12	31 11	21 33	31 43	29	10	16
58	19 1	27 58	19 22	28 30	19 44	29 2	20 5	29 34	20 27	30 7	20 48	30 39	21 10	31 11	21 32	31 43	30	11	16
69°	54′		55′		56′		57′		58′		59′		60′		61′		31	11	17
0′	18 59	27 58	19 21	28 30	19 42	29 3	20 4	29 35	20 25	30 7	20 47	30 39	21 8	31 12	21 30	31 44	32	11	17
2	18 57	27 58	19 19	28 31	19 40	29 3	20 2	29 35	20 23	30 7	20 45	30 40	21 6	31 12	21 28	31 44	33	12	18
4	18 56	27 59	19 17	28 31	19 38	29 3	20 0	29 36	20 21	30 8	20 43	30 40	21 4	31 12	21 26	31 45	34	12	18
6	18 54	27 59	19 15	28 32	19 37	29 4	19 58	29 36	20 20	30 8	20 41	30 41	21 2	31 13	21 24	31 45	35	13	19
8	18 52	28 0	19 14	28 32	19 35	29 4	19 56	29 36	20 18	30 9	20 39	30 41	21 0	31 13	21 22	31 46	36	13	19
10	18 50	28 0	19 12	28 32	19 33	29 5	19 54	29 37	20 16	30 9	20 37	30 41	20 58	31 14	21 20	31 46	37	13	20
12	18 49	28 0	19 10	28 33	19 31	29 5	19 53	29 37	20 14	30 9	20 35	30 42	20 57	31 14	21 18	31 46	38	14	20
14	18 47	28 1	19 8	28 33	19 29	29 5	19 51	29 38	20 12	30 10	20 33	30 42	20 55	31 15	21 16	31 47	39	14	21
16	18 45	28 1	19 7	28 33	19 28	29 6	19 49	29 38	20 10	30 10	20 31	30 43	20 53	31 15	21 14	31 47	40	14	21
18	18 44	28 1	19 5	28 34	19 26	29 6	19 47	29 38	20 8	30 11	20 30	30 43	20 51	31 15	21 12	31 48	41	15	22
20	18 42	28 2	19 3	28 34	19 24	29 6	19 45	29 39	20 6	30 11	20 28	30 43	20 49	31 16	21 10	31 48	42	15	23
22	18 40	28 2	19 1	28 34	19 22	29 7	19 43	29 39	20 5	30 11	20 26	30 44	20 47	31 16	21 8	31 49	43	15	23
24	18 38	28 3	18 59	28 35	19 21	29 7	19 42	29 40	20 3	30 12	20 24	30 44	20 45	31 17	21 6	31 49	44	16	24
26	18 37	28 3	18 58	28 35	19 19	29 8	19 40	29 40	20 1	30 12	20 22	30 45	20 43	31 17	21 4	31 49	45	16	24
28	18 35	28 3	18 56	28 36	19 17	29 8	19 38	29 40	19 59	30 12	20 20	30 45	20 41	31 17	21 2	31 50	46	16	25
30	18 33	28 4	18 54	28 36	19 15	29 8	19 36	29 41	19 57	30 13	20 18	30 45	20 39	31 18	21 0	31 50	47	17	25
32	18 31	28 4	18 52	28 36	19 13	29 9	19 34	29 41	19 55	30 13	20 16	30 46	20 37	31 18	20 58	31 51	48	17	26
34	18 30	28 4	18 51	28 37	19 12	29 9	19 33	29 42	19 53	30 14	20 14	30 46	20 35	31 19	20 56	31 51	49	18	27
36	18 28	28 5	18 49	28 37	19 10	29 10	19 31	29 42	19 52	30 14	20 13	30 47	20 33	31 19	20 54	31 51	50	18	27
38	18 26	28 5	18 47	28 38	19 8	29 10	19 29	29 42	19 50	30 15	20 11	30 47	20 32	31 19	20 52	31 52	51	19	28
40	18 24	28 5	18 45	28 38	19 6	29 10	19 27	29 43	19 48	30 15	20 9	30 47	20 30	31 20	20 50	31 52	52	19	28
42	18 23	28 6	18 44	28 38	19 4	29 11	19 25	29 43	19 46	30 15	20 7	30 48	20 28	31 20	20 49	31 53	53	19	29
44	18 21	28 6	18 42	28 39	19 3	29 11	19 23	29 43	19 44	30 16	20 5	30 48	20 26	31 21	20 47	31 53	54	20	29
46	18 19	28 7	18 40	28 39	19 1	29 11	19 22	29 44	19 42	30 16	20 3	30 49	20 24	31 21	20 45	31 54	55	20	30
48	18 18	28 7	18 38	28 39	18 59	29 12	19 20	29 44	19 40	30 17	20 1	30 49	20 22	31 22	20 43	31 54	56	20	30
50	18 16	28 7	18 37	28 40	18 57	29 12	19 18	29 45	19 39	30 17	19 59	30 50	20 20	31 22	20 41	31 54	57	21	31
52	18 14	28 8	18 35	28 40	18 55	29 13	19 16	29 45	19 37	30 17	19 57	30 50	20 18	31 22	20 39	31 55	58	21	31
54	18 12	28 8	18 33	28 41	18 54	29 13	19 14	29 45	19 35	30 18	19 55	30 50	20 16	31 23	20 37	31 55	59	21	32
56	18 11	28 9	18 31	28 41	18 52	29 13	19 12	29 46	19 33	30 18	19 54	30 51	20 14	31 23	20 35	31 55	60	22	32
58	18 9	28 9	18 29	28 41	18 50	29 14	19 11	29 46	19 31	30 19	19 52	30 51	20 12	31 24	20 33	31 56	90	5	0

Alt.	☽ A	☉ A
°	″	″
3	8	8
4	6	5
5	4	4
6	3	3
7	3	2
8	2	2
9	2	1
10	2	1
20	2	0
30	3	0
40	3	0
50	4	0
60	4	0
70	5	0
90	5	0

(70° and 71°) Correction of the Moon's Altitude, and the Aux. Angle A.

App. Alt.	Minutes of Moon's Hor. Parallax. 54′		55′		56′		57′		58′		59′		60′		61′	
70°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
0′	18 7	28 9	18 28	28 42	18 48	29 14	19 9	29 47	19 29	30 19	19 50	30 52	20 10	31 24	20 31	31 56
2	18 5	28 10	18 26	28 42	18 46	29 15	19 7	29 47	19 27	30 19	19 48	30 52	20 8	31 24	20 29	31 57
4	18 4	28 10	18 24	28 43	18 45	29 15	19 5	29 47	19 26	30 20	19 46	30 52	20 7	31 25	20 27	31 57
6	18 2	28 10	18 22	28 43	18 43	29 15	19 3	29 48	19 24	30 20	19 44	30 53	20 5	31 25	20 25	31 58
8	18 0	28 11	18 21	28 43	18 41	29 16	19 1	29 48	19 22	30 21	19 42	30 53	20 3	31 26	20 23	31 58
10	17 58	28 11	18 19	28 44	18 39	29 16	19 0	29 49	19 20	30 21	19 40	30 54	20 1	31 26	20 21	31 59
12	17 57	28 11	18 17	28 44	18 37	29 16	18 58	29 49	19 18	30.21	19 38	30 54	19 59	31 26	20 19	31 59
14	17 55	28 12	18 15	28 44	18 36	29 17	18 56	29 49	19 16	30.22	19 36	30 54	19 57	31 27	20 17	31 59
16	17 53	28 12	18 14	28 45	18 34	29 17	18 54	29 50	19 14	30 22	19 35	30 55	19 55	31 27	20 15	32 0
18	17 52	28 13	18 12	28 45	18 32	29 18	18 52	29 50	19 12	30 23	19 33	30 55	19 53	31 28	20 13	32 0
20	17 50	28 13	18 10	28 45	18 30	29 18	18 50	29 50	19 11	30 23	19 31	30 55	19 51	31 28	20 11	32 1
22	17 48	28 13	18 8	28 46	18 28	29 18	18 49	29 51	19 9	30 23	19 29	30 56	19 49	31 29	20 9	32 1
24	17 46	28 14	18 6	28 46	18 27	29 19	18 47	29 51	19 7	30 24	19 27	30 56	19 47	31 29	20 7	32 1
26	17 45	28 14	18 5	28 47	18 25	29 19	18 45	29 52	19 5	30 24	19 25	30 57	19 45	31 29	20 5	32 2
28	17 43	28 14	18 3	28 47	18 23	29 19	18 43	29 52	19 3	30 25	19 23	30 57	19 43	31 30	20 3	32 2
30	17 41	28 15	18 1	28 47	18 21	29 20	18 41	29 52	19 1	30 25	19 21	30 58	19 41	31 30	20 1	32 3
32	17 39	28 15	17 59	28 48	18 19	29 20	18 39	29 53	18 59	30 25	19 19	30 58	19 39	31 31	19 59	32 3
34	17 38	28 15	17 58	28 48	18 18	29 21	18 38	29 53	18 58	30 26	19 18	30 58	19 37	31 31	19 58	32 4
36	17 36	28 16	17 56	28 48	18 16	29 21	18 36	29 54	18 56	30 26	19 16	30 59	19 36	31 31	19 56	32 4
38	17 34	28 16	17 54	28 49	18 14	29 21	18 34	29 54	18 54	30 27	19 14	30 59	19 34	31 32	19 54	32 4
40	17 32	28 17	17 52	28 49	18 12	29 22	18 32	29 54	18 52	30 27	19 12	31 0	19 32	31 32	19 52	32 5
42	17 31	28 17	17 51	28 50	18 10	29 22	18 30	29 55	18 50	30 27	19 10	31 0	19 30	31 33	19 50	32 5
44	17 29	28 17	17 49	28 50	18 9	29 23	18 28	29 55	18 48	30 28	19 8	31 0	19 28	31 33	19 48	32 6
46	17 27	28 18	17 47	28 50	18 7	29 23	18 27	29 56	18 46	30 28	19 6	31 1	19 26	31 33	19 46	32 6
48	17 26	28 18	17 45	28 51	18 5	29 23	18 25	29 56	18 45	30 29	19 4	31 1	19 24	31 34	19 44	32 6
50	17 24	28 18	17 44	28 51	18 3	29 24	18 23	29 56	18 43	30 29	19 2	31 2	19 22	31 34	19 42	32 7
52	17 22	28 19	17 42	28 51	18 1	29 24	18 21	29 57	18 41	30 29	19 0	31 2	19 20	31 35	19 40	32 7
54	17 20	28 19	17 40	28 52	18 0	29 24	18 19	29 57	18 39	30 30	18 59	31 2	19 18	31 35	19 38	32 8
56	17 19	28 19	17 38	28 52	17 58	29 25	18 17	29 57	18 37	30 30	18 57	31 3	19 16	31 35	19 36	32 8
58	17 17	28 20	17 36	28 53	17 56	29 25	18 16	29 58	18 35	30 31	18 55	31 3	19 14	31 36	19 34	32 8
71°	54′		55′		56′		57′		58′		59′		60′		61′	
0′	17 15	28 20	17 35	28 53	17 54	29 25	18 14	29 58	18 33	30 31	18 53	31 4	19 12	31 36	19 32	32 9
2	17 13	28 21	17 33	28 53	17 52	29 26	18 12	29 59	18 32	30 31	18 51	31 4	19 11	31 37	19 30	32 9
4	17 12	28 21	17 31	28 54	17 51	29 26	18 10	29 59	18 30	30 32	18 49	31 4	19 9	31 37	19 28	32 10
6	17 10	28 21	17 29	28 54	17 49	29 27	18 8	29 59	18 28	30 32	18 47	31 5	19 7	31 37	19 26	32 10
8	17 8	28 22	17 28	28 54	17 47	29 27	18 6	30 0	18 26	30 32	18 45	31 5	19 5	31 38	19 24	32 10
10	17 6	28 22	17 26	28 55	17 45	29 27	18 5	30 0	18 24	30 33	18 43	31 5	19 3	31 38	19 22	32 11
12	17 5	28 22	17 24	28 55	17 43	29 28	18 3	30 0	18 22	30 33	18 41	31 6	19 1	31 38	19 20	32 11
14	17 3	28 23	17 22	28 55	17 42	29 28	18 1	30 1	18 20	30 33	18 39	31 6	18 59	31 39	19 18	32 12
16	17 1	28 23	17 20	28 56	17 40	29 28	17 59	30 1	18 18	30 34	18 38	31 6	18 57	31 39	19 16	32 12
18	16 59	28 23	17 19	28 56	17 38	29 29	17 57	30 1	18 16	30 34	18 36	31 7	18 55	31 39	19 14	32 12
20	16 58	28 24	17 17	28 56	17 36	29 29	17 55	30 2	18 14	30 34	18 34	31 7	18 53	31 40	19 12	32 13
22	16 56	28 24	17 15	28 57	17 34	29 29	17 53	30 2	18 13	30 35	18 32	31 7	18 51	31 40	19 10	32 13
24	16 54	28 24	17 13	28 57	17 32	29 30	17 52	30 2	18 11	30 35	18 30	31 8	18 49	31 41	19 8	32 13
26	16 52	28 25	17 12	28 57	17 31	29 30	17 50	30 3	18 9	30 36	18 28	31 8	18 47	31 41	19 6	32 14
28	16 51	28 25	17 10	28 58	17 29	29 30	17 48	30 3	18 7	30 36	18 26	31 9	18 45	31 41	19 4	32 14
30	16 49	28 25	17 8	28 58	17 27	29 31	17 46	30 4	18 5	30 36	18 24	31 9	18 43	31 42	19 2	32 15
32	16 47	28 26	17 6	28 58	17 25	29 31	17 44	30 4	18 3	30 37	18 22	31 9	18 41	31 42	19 0	32 15
34	16 45	28 26	17 4	28 59	17 23	29 32	17 42	30 4	18 1	30 37	18 20	31 10	18 39	31 43	18 58	32 15
36	16 44	28 26	17 3	28 59	17 22	29 32	17 40	30 5	17 59	30 37	18 18	31 10	18 37	31 43	18 56	32 16
38	16 42	28 27	17 1	28 59	17 20	29 32	17 39	30 5	17 58	30 38	18 17	31 11	18 35	31 43	18 54	32 16
40	16 40	28 27	16 59	29 0	17 18	29 33	17 37	30 5	17 56	30 38	18 15	31 11	18 33	31 44	18 52	32 16
42	16 38	28 27	16 57	29 0	17 16	29 33	17 35	30 6	17 54	30 38	18 13	31 11	18 31	31 44	18 50	32 17
44	16 37	28 28	16 55	29 0	17 14	29 33	17 33	30 6	17 52	30 39	18 11	31 12	18 29	31 44	18 48	32 17
46	16 35	28 28	16 54	29 1	17 12	29 34	17 31	30 7	17 50	30 39	18 9	31 12	18 27	31 45	18 46	32 18
48	16 33	28 28	16 52	29 1	17 11	29 34	17 29	30 7	17 48	30 40	18 7	31 12	18 26	31 45	18 44	32 18
50	16 31	28 29	16 50	29 1	17 9	29 34	17 28	30 7	17 46	30 40	18 5	31 13	18 24	31 46	18 42	32 18
52	16 30	28 29	16 48	29 2	17 7	29 35	17 26	30 8	17 44	30 40	18 3	31 13	18 22	31 46	18 40	32 19
54	16 28	28 29	16 47	29 2	17 5	29 35	17 24	30 8	17 43	30 41	18 1	31 13	18 20	31 46	18 38	32 19
56	16 26	28 30	16 45	29 3	17 3	29 35	17 22	30 8	17 41	30 41	17 59	31 14	18 18	31 47	18 36	32 20
58	16 24	28 30	16 43	29 3	17 2	29 36	17 20	30 9	17 39	30 41	17 57	31 14	18 16	31 47	18 34	32 20

Seconds of H. P.		
″	Corr	A
	″	″
1	0	1
2	1	1
3	1	2
4	1	2
5	2	3
6	2	3
7	2	4
8	3	4
9	3	5
10	3	5
11	4	6
12	4	7
13	4	7
14	5	8
15	5	8
16	5	9
17	6	9
18	6	10
19	6	10
20	6	11
21	7	11
22	7	12
23	7	12
24	8	13
25	8	14
26	8	14
27	9	15
28	9	15
29	9	16
30	10	16
31	10	17
32	10	17
33	11	18
34	11	18
35	11	19
36	12	20
37	12	20
38	12	21
39	13	21
40	13	22
41	13	22
42	14	23
43	14	23
44	14	24
45	15	24
46	15	25
47	15	25
48	16	26
49	16	27
50	16	27
51	17	28
52	17	28
53	17	29
54	18	29
55	18	30
56	18	30
57	19	31
58	19	31
59	19	32

App. Alt.	☉	A
	″	″
3	8	8
4	6	5
5	4	4
6	3	3
7	3	2
8	2	2
9	2	1
10	2	1
20	2	0
30	3	0
40	3	0
50	4	0
60	4	0
70	5	0
90	5	0

Correction of the Moon's Altitude, and the Aux. Angle A. (72° and 73°)

App. Alt.	Minutes of Moon's Hor. Parallax. 54′		55′		56′		57′		58′		59′		60′		61′	
72°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr +	A 60°	Corr. −	A 60°
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
0′	16 23	28 30	1 : 41	29 3	17 0	29 36	17 18	30 9	17 37	30 42	17 55	31 15	18 14	31 47	18 32	32 20
2	16 21	28 31	16 39	29 4	16 58	29 36	17 16	30 9	17 35	30 42	17 53	31 15	18 12	31 48	18 30	32 21
4	16 19	28 31	16 38	29 4	16 56	29 37	17 15	30 10	17 33	30 42	17 52	31 15	18 10	31 48	18 28	32 21
6	16 17	28 31	16 36	29 4	16 54	29 37	17 13	30 10	17 31	30 43	17 50	31 16	18 8	31 49	18 26	32 21
8	16 16	28 32	16 34	29 5	16 52	29 37	17 11	30 10	17 29	30 43	17 48	31 16	18 6	31 49	18 24	32 22
10	16 14	28 32	16 32	29 5	16 51	29 38	17 9	30 11	17 27	30 43	17 46	31 16	18 4	31 49	18 22	32 22
12	16 12	28 32	16 30	29 5	16 49	29 38	17 7	30 11	17 25	30 44	17 44	31 17	18 2	31 50	18 20	32 22
14	16 10	28 33	16 29	29 6	16 47	29 38	17 5	30 11	17 24	30 44	17 42	31 17	18 0	31 50	18 18	32 23
16	16 9	28 33	16 27	29 6	16 45	29 39	17 3	30 12	17 22	30 45	17 40	31 17	17 58	31 50	18 16	32 23
18	16 7	28 33	16 25	29 6	16 43	29 39	17 2	30 12	17 20	30 45	17 38	31 18	17 56	31 51	18 14	32 24
20	16 5	28 34	16 23	29 6	16 41	29 39	17 0	30 12	17 18	30 45	17 36	31 18	17 54	31 51	18 12	32 24
22	16 3	28 34	16 21	29 7	16 40	29 40	16 58	30 13	17 16	30 46	17 34	31 18	17 52	31 51	18 11	32 24
24	16 2	28 34	16 20	29 7	16 38	29 40	16 56	30 13	17 14	30 46	17 32	31 19	17 50	31 52	18 9	32 25
26	16 0	28 35	16 18	29 7	16 36	29 41	16 54	30 13	17 12	30 46	17 30	31 19	17 48	31 52	18 7	32 25
26	15 58	28 35	16 16	29 8	16 34	29 41	16 52	30 14	17 10	30 47	17 28	31 19	17 46	31 52	18 5	32 25
30	15 56	28 35	16 14	29 8	16 32	29 41	16 50	30 14	17 8	30 47	17 26	31 20	17 44	31 53	18 3	32 26
32	15 54	28 35	16 12	29 8	16 31	29 42	16 49	30 14	17 6	30 47	17 25	31 20	17 43	31 53	18 1	32 26
34	15 53	28 36	16 11	29 9	16 29	29 42	16 47	30 15	17 5	30 48	17 23	31 21	17 41	31 53	17 59	32 26
36	15 51	28 36	16 9	29 9	16 27	29 42	16 45	30 15	17 3	30 48	17 21	31 21	17 39	31 54	17 57	32 27
38	15 49	28 36	16 7	29 9	16 25	29 43	16 43	30 15	17 1	30 49	17 19	31 21	17 37	31 54	17 55	32 27
40	15 47	28 37	16 5	29 10	16 23	29 43	16 41	30 16	16 59	30 49	17 17	31 22	17 35	31 54	17 53	32 27
42	15 46	28 37	16 4	29 10	16 21	29 43	16 39	30 16	16 57	30 49	17 14	31 22	17 33	31 55	17 51	32 28
44	15 44	28 37	16 2	29 10	16 20	29 43	16 37	30 16	16 55	30 49	17 12	31 22	17 31	31 55	17 49	32 28
46	15 42	28 38	16 0	29 11	16 18	29 44	16 36	30 17	16 53	30 50	17 10	31 23	17 29	31 56	17 47	32 29
48	15 40	28 38	15 58	29 11	16 16	29 44	16 34	30 17	16 51	30 50	17 9	31 23	17 27	31 56	17 45	32 29
50	15 39	28 38	15 56	29 11	16 14	29 44	16 32	30 17	16 49	30 50	17 7	31 23	17 25	31 56	17 43	32 29
52	15 37	28 39	15 55	29 12	16 12	29 45	16 30	30 18	16 48	30 51	17 5	31 24	17 23	31 57	17 41	32 30
54	15 35	28 39	15 53	29 12	16 10	29 45	16 28	30 18	16 46	30 51	17 3	31 24	17 21	31 57	17 39	32 30
56	15 33	28 39	15 51	29 12	16 9	29 45	16 26	30 18	16 44	30 51	17 1	31 24	17 19	31 57	17 37	32 30
58	15 32	28 40	15 49	29 13	16 7	29 46	16 24	30 19	16 42	30 52	16 59	31 25	17 17	31 58	17 35	32 31
73°	54′		55′		56′		57′		58′		59′		60′		61′	
0′	15 30	28 40	15 47	29 13	16 5	29 46	16 22	30 19	16 40	30 52	16 57	31 25	17 15	31 58	17 33	32 31
2	15 28	28 40	15 46	29 13	16 3	29 46	16 21	30 19	16 38	30 52	16 56	31 25	17 13	31 59	17 31	32 32
4	15 26	28 40	15 44	29 14	16 1	29 47	16 19	30 20	16 36	30 53	16 54	31 26	17 11	31 59	17 29	32 32
6	15 24	28 41	15 42	29 14	15 59	29 47	16 17	30 20	16 34	30 53	16 52	31 26	17 9	31 59	17 27	32 32
8	15 23	28 41	15 40	29 14	15 58	29 47	16 15	30 20	16 32	30 53	16 50	31 26	17 7	32 0	17 25	32 33
10	15 21	28 41	15 38	29 14	15 56	29 48	16 13	30 21	16 30	30 54	16 48	31 27	17 5	32 0	17 23	32 33
12	15 19	28 42	15 37	29 15	15 54	29 48	16 11	30 21	16 29	30 54	16 46	31 27	17 3	32 0	17 21	32 33
14	15 17	28 42	15 35	29 15	15 52	29 48	16 9	30 21	16 27	30 54	16 44	31 27	17 1	32 1	17 19	32 34
16	15 16	28 42	15 33	29 15	15 50	29 48	16 7	30 22	16 25	30 55	16 42	31 28	16 59	32 1	17 17	32 34
18	15 14	28 43	15 31	29 16	15 48	29 49	16 6	30 22	16 23	30 55	16 40	31 28	16 57	32 1	17 15	32 34
20	15 12	28 43	15 29	29 16	15 46	29 49	16 4	30 22	16 21	30 55	16 38	31 28	16 55	32 1	17 13	32 35
22	15 10	28 43	15 27	29 16	15 45	29 49	16 2	30 23	16 19	30 56	16 36	31 29	16 53	32 2	17 11	32 35
24	15 9	28 44	15 26	29 17	15 43	29 50	16 0	30 23	16 17	30 56	16 34	31 29	16 51	32 2	17 9	32 35
26	15 7	28 44	15 24	29 17	15 41	29 50	15 58	30 23	16 15	30 56	16 32	31 29	16 49	32 3	17 7	32 36
28	15 5	28 44	15 22	29 17	15 39	29 50	15 56	30 24	16 13	30 57	16 30	31 30	16 47	32 3	17 5	32 36
30	15 3	28 44	15 20	29 18	15 37	29 51	15 54	30 24	16 11	30 57	16 28	31 30	16 45	32 3	17 3	32 36
32	15 1	28 45	15 18	29 18	15 36	29 51	15 53	30 24	16 9	30 57	16 27	31 30	16 44	32 4	17 1	32 37
34	15 0	28 45	15 17	29 18	15 34	29 51	15 51	30 25	16 8	30 58	16 25	31 31	16 42	32 4	16 59	32 37
36	14 58	28 45	15 15	29 19	15 32	29 52	15 48	30 25	16 6	30 58	16 23	31 31	16 40	32 4	16 57	32 37
38	14 56	28 46	15 13	29 19	15 30	29 52	15 47	30 25	16 4	30 58	16 21	31 31	16 38	32 5	16 55	32 38
40	14 54	28 46	15 11	29 19	15 28	29 52	15 45	30 25	16 2	30 59	16 19	31 32	16 36	32 5	16 53	32 38
42	14 53	28 46	15 9	29 19	15 26	29 53	15 43	30 26	16 0	30 59	16 17	31 32	16 34	32 5	16 51	32 39
44	14 51	28 47	15 8	29 20	15 25	29 53	15 41	30 26	15 58	30 59	16 15	31 32	16 32	32 6	16 49	32 39
46	14 49	28 47	15 6	29 20	15 23	29 53	15 39	30 26	15 56	31 0	16 13	31 33	16 30	32 6	16 47	32 39
48	14 47	28 47	15 4	29 20	15 21	29 54	15 38	30 27	15 54	31 0	16 11	31 33	16 28	32 6	16 45	32 39
50	14 46	28 47	15 2	29 21	15 19	29 54	15 36	30 27	15 52	31 0	16 9	31 33	16 26	32 7	16 43	32 40
52	14 44	28 48	15 0	29 21	15 17	29 54	15 34	30 27	15 50	31 1	16 7	31 34	16 24	32 7	16 41	32 40
54	14 42	28 48	14 59	29 21	15 15	29 54	15 32	30 28	15 49	31 1	16 5	31 34	16 22	32 7	16 39	32 40
56	14 40	28 48	14 57	29 22	15 13	29 55	15 30	30 28	15 47	31 1	16 3	31 34	16 20	32 8	16 37	32 41
58	14 38	28 49	14 55	29 22	15 12	29 55	15 28	30 28	15 45	31 1	16 1	31 35	16 18	32 8	16 35	32 41

Seconds of H. P.

″	Corr. ″	A ″
1	0	1
2	1	1
3	1	2
4	1	2
5	1	3
6	2	3
7	2	4
8	2	4
9	3	5
10	3	6
11	3	6
12	3	7
13	4	7
14	4	8
15	4	8
16	5	9
17	5	9
18	5	10
19	6	10
20	6	11
21	6	12
22	6	12
23	7	13
24	7	13
25	7	14
26	8	14
27	8	15
28	8	15
29	8	16
30	9	17
31	9	17
32	9	18
33	10	18
34	10	19
35	10	19
36	10	20
37	11	20
38	11	21
39	11	21
40	12	22
41	12	23
42	12	23
43	13	24
44	13	24
45	13	25
46	13	25
47	14	26
48	14	26
49	14	27
50	15	28
51	15	28
52	15	29
53	15	29
54	16	30
55	16	30
56	16	31
57	17	31
58	17	32
59	17	32

Alt.	☉	A ●
°	″	″
3	8	8
4	6	5
5	4	4
6	3	3
7	3	2
8	2	2
9	2	1
10	2	1
20	2	0
30	3	0
40	3	0
50	4	0
60	4	0
70	5	0
90	5	0

(74° and 75°) Correction of the Moon's Altitude, and the Aux. Angle A.

App. Alt.	Minutes of Moon's Hor. Parallax. 54′		55′		56′		57′		58′		59′		60′		61′	
74°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
0′	14 37	28 49	14 53	29 22	15 10	29 55	15 26	30 29	15 43	31 2	15 59	31 35	16 16	32 8	16 32	32 41
2	14 35	28 49	14 51	29 22	15 8	29 56	15 24	30 29	15 41	31 2	15 57	31 35	16 14	32 9	16 30	32 42
4	14 33	28 50	14 50	29 23	15 6	29 56	15 23	30 29	15 39	31 2	15 55	31 36	16 12	32 9	16 28	32 42
6	14 31	28 50	14 48	29 23	15 4	29 56	15 21	30 30	15 37	31 3	15 54	31 36	16 10	32 9	16 26	32 42
8	14 30	28 50	14 46	29 23	15 2	29 57	15 19	30 30	15 35	31 3	15 52	31 36	16 8	32 9	16 24	32 43
10	14 28	28 50	14 44	29 24	15 1	29 57	15 17	30 30	15 33	31 3	15 50	31 37	16 6	32 10	16 22	32 43
12	14 26	28 51	14 42	29 24	14 59	29 57	15 15	30 30	15 31	31 4	15 48	31 37	16 4	32 10	16 20	32 43
14	14 24	28 51	14 41	29 24	14 57	29 57	15 13	30 31	15 29	31 4	15 46	31 37	16 2	32 10	16 18	32 44
16	14 22	28 51	14 39	29 25	14 55	29 58	15 11	30 31	15 28	31 4	15 44	31 38	16 0	32 11	16 16	32 44
18	14 21	28 52	14 37	29 25	14 53	29 58	15 9	30 31	15 26	31 5	15 42	31 38	15 58	32 11	16 14	32 44
20	14 19	28 52	14 35	29 25	14 51	29 58	15 7	30 32	15 24	31 5	15 40	31 38	15 56	32 11	16 12	32 45
22	14 17	28 52	14 33	29 25	14 49	29 59	15 6	30 32	15 22	31 5	15 38	31 39	15 54	32 12	16 10	32 45
24	14 15	28 52	14 31	29 26	14 48	29 59	15 4	30 32	15 20	31 6	15 36	31 39	15 52	32 12	16 8	32 45
26	14 14	28 53	14 30	29 26	14 46	29 59	15 2	30 33	15 18	31 6	15 34	31 39	15 50	32 12	16 6	32 46
28	14 12	28 53	14 28	29 26	14 44	30 0	15 0	30 33	15 16	31 6	15 32	31 39	15 48	32 13	16 4	32 46
30	14 10	28 53	14 26	29 27	14 42	30 0	14 58	30 33	15 14	31 6	15 30	31 40	15 46	32 13	16 2	32 46
32	14 8	28 54	14 24	29 27	14 40	30 0	14 56	30 33	15 12	31 7	15 28	31 40	15 44	32 13	16 0	32 47
34	14 6	28 54	14 22	29 27	14 38	30 0	14 54	30 34	15 10	31 7	15 26	31 40	15 42	32 14	15 58	32 47
36	14 5	28 54	14 21	29 28	14 36	30 1	14 52	30 34	15 8	31 7	15 24	31 41	15 40	32 14	15 56	32 47
38	14 3	28 55	14 19	29 28	14 35	30 1	14 51	30 34	15 7	31 8	15 22	31 41	15 38	32 14	15 54	32 48
40	14 1	28 55	14 17	29 28	14 33	30 1	14 49	30 35	15 5	31 8	15 20	31 41	15 36	32 15	15 52	32 48
42	13 59	28 55	14 15	29 28	14 31	30 2	14 47	30 35	15 3	31 8	15 19	31 42	15 34	32 15	15 50	32 48
44	13 58	28 55	14 13	29 29	14 29	30 2	14 45	30 35	15 0	31 9	15 17	31 42	15 32	32 15	15 48	32 49
46	13 56	28 56	14 12	29 29	14 27	30 2	14 43	30 36	14 59	31 9	15 15	31 42	15 30	32 16	15 46	32 49
48	13 54	28 56	14 10	29 29	14 25	30 3	14 41	30 36	14 57	31 9	15 13	31 43	15 28	32 16	15 44	32 49
50	13 52	28 56	14 8	29 30	14 24	30 3	14 39	30 36	14 55	31 10	15 11	31 43	15 26	32 16	15 42	32 49
52	13 50	28 57	14 6	29 30	14 22	30 3	14 37	30 36	14 53	31 10	15 9	31 43	15 24	32 17	15 40	32 50
54	13 49	28 57	14 4	29 30	14 20	30 3	14 36	30 37	14 51	31 10	15 7	31 43	15 22	32 17	15 38	32 50
56	13 47	28 57	14 2	29 30	14 18	30 4	14 34	30 37	14 49	31 10	15 5	31 44	15 20	32 17	15 36	32 50
58	13 45	28 57	14 1	29 31	14 16	30 4	14 32	30 37	14 47	31 11	15 2	31 44	15 18	32 17	15 34	32 51
75°	54′		55′		56′		57′		58′		59′		60′		61′	
0′	13 43	28 58	13 59	29 31	14 14	30 4	14 30	30 38	14 45	31 11	15 1	31 44	15 16	32 18	15 32	32 51
2	13 41	28 58	13 57	29 31	14 13	30 5	14 28	30 38	14 43	31 11	14 59	31 45	15 14	32 18	15 30	32 51
4	13 39	28 58	13 55	29 32	14 11	30 5	14 26	30 38	14 42	31 12	14 57	31 45	15 12	32 18	15 28	32 52
6	13 38	28 59	13 53	29 32	14 9	30 5	14 24	30 39	14 40	31 12	14 55	31 45	15 10	32 19	15 26	32 52
8	13 36	28 59	13 52	29 32	14 7	30 6	14 22	30 39	14 38	31 12	14 53	31 46	15 8	32 19	15 24	32 52
10	13 34	28 59	13 50	29 32	14 5	30 6	14 20	30 39	14 36	31 12	14 51	31 46	15 6	32 19	15 22	32 53
12	13 33	28 59	13 48	29 33	14 3	30 6	14 19	30 39	14 34	31 13	14 49	31 46	15 4	32 20	15 20	32 53
14	13 31	29 0	13 46	29 33	14 1	30 6	14 17	30 40	14 32	31 13	14 47	31 46	15 2	32 20	15 18	32 53
16	13 29	29 0	13 44	29 33	14 0	30 7	14 15	30 40	14 30	31 13	14 45	31 47	15 0	32 20	15 16	32 53
18	13 27	29 0	13 42	29 34	13 58	30 7	14 13	30 40	14 28	31 14	14 43	31 47	14 58	32 20	15 14	32 54
20	13 25	29 0	13 41	29 34	13 56	30 7	14 11	30 41	14 26	31 14	14 41	31 47	14 56	32 21	15 12	32 54
22	13 24	29 1	13 39	29 34	13 54	30 7	14 9	30 41	14 24	31 14	14 39	31 48	14 55	32 21	15 10	32 54
24	13 22	29 1	13 37	29 34	13 52	30 8	14 7	30 41	14 22	31 14	14 38	31 48	14 53	32 21	15 8	32 55
26	13 20	29 1	13 35	29 35	13 50	30 8	14 5	30 41	14 21	31 15	14 36	31 48	14 51	32 22	15 6	32 55
28	13 18	29 1	13 33	29 35	13 48	30 8	14 3	30 42	14 19	31 15	14 34	31 48	14 49	32 22	15 4	32 55
30	13 16	29 2	13 31	29 35	13 46	30 9	14 2	30 42	14 17	31 15	14 32	31 49	14 47	32 22	15 2	32 56
32	13 15	29 2	13 30	29 35	13 45	30 9	14 0	30 42	14 15	31 16	14 30	31 49	14 45	32 22	15 0	32 56
34	13 13	29 2	13 28	29 36	13 43	30 9	13 58	30 43	14 13	31 16	14 28	31 49	14 43	32 23	14 58	32 56
36	13 11	29 2	13 26	29 36	13 41	30 9	13 56	30 43	14 12	31 16	14 26	31 50	14 41	32 23	14 56	32 57
38	13 9	29 3	13 24	29 36	13 39	30 10	13 54	30 43	14 10	31 17	14 25	31 50	14 39	32 23	14 54	32 57
40	13 7	29 3	13 22	29 36	13 37	30 10	13 52	30 43	14 8	31 17	14 23	31 50	14 38	32 24	14 51	32 57
42	13 6	29 3	13 21	29 37	13 35	30 10	13 50	30 44	14 6	31 17	14 21	31 51	14 36	32 24	14 49	32 57
44	13 4	29 4	13 19	29 37	13 33	30 10	13 48	30 44	14 4	31 17	14 19	31 51	14 33	32 24	14 47	32 58
46	13 2	29 4	13 17	29 37	13 32	30 11	13 46	30 44	14 2	31 18	14 17	31 51	14 31	32 25	14 45	32 58
48	13 0	29 4	13 15	29 38	13 30	30 11	13 45	30 45	14 0	31 18	14 15	31 51	14 29	32 25	14 43	32 58
50	12 59	29 4	13 13	29 38	13 28	30 11	13 43	30 45	13 58	31 18	14 12	31 52	14 27	32 25	14 41	32 59
52	12 57	29 5	13 11	29 38	13 26	30 12	13 41	30 45	13 56	31 19	14 10	31 52	14 25	32 25	14 39	32 59
54	12 55	29 5	13 10	29 38	13 24	30 12	13 39	30 45	13 54	31 19	14 8	31 52	14 23	32 26	14 37	32 59
56	12 53	29 5	13 8	29 39	13 22	30 12	13 37	30 46	13 52	31 19	14 6	31 53	14 21	32 26	14 35	33 0
58	12 51	29 5	13 6	29 39	13 21	30 12	13 35	30 46	13 50	31 19	14 4	31 53	14 19	32 26	14 33	33 0

Seconds of H. P.

	Cor.	A
	″	″
1	0	1
2	1	1
3	1	2
4	1	2
5	1	3
6	2	3
7	2	4
8	2	4
9	2	5
10	3	6
11	3	6
12	3	7
13	3	7
14	4	8
15	4	8
16	4	9
17	4	9
18	5	10
19	5	11
20	5	11
21	5	12
22	6	12
23	6	13
24	6	13
25	6	14
26	7	15
27	7	15
28	7	16
29	7	16
30	8	17
31	8	17
32	8	18
33	9	18
34	9	19
35	9	20
36	9	20
37	10	21
38	10	21
39	10	22
40	10	22
41	11	23
42	11	23
43	11	24
44	11	25
45	12	25
46	12	26
47	12	26
48	12	27
49	13	27
50	13	28
51	13	28
52	13	29
53	14	30
54	14	30
55	14	31
56	14	31
57	15	32
58	15	32
59	15	33

Alt.	A ☉	A ☽
	″	″
0		8
4	6	5
5	4	4
6	3	3
7	3	2
8	2	2
9	2	1
10	2	1
20	2	0
30	2	0
40	2	0
50	4	0
60	4	0
70	5	0
90	5	0

Correction of the Moon's Altitude, and the Aux. Angle A. (76° and 77°)

App. Alt.	Minutes of Moon's Hor. Parallax. 54′		55′		56′		57′		58′		59′		60′		61′	
76°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
0	12 50	29 6	13 4	29 39	13 19	30 13	13 33	30 46	13 48	31 20	14 2	31 53	14 17	32 27	14 31	33 0
2	12 48	29 6	13 2	29 39	13 17	30 13	13 31	30 46	13 46	31 20	14 0	31 53	14 15	32 27	14 29	33 0
4	12 46	29 6	13 0	29 40	13 15	30 13	13 29	30 47	13 44	31 20	13 58	31 54	14 13	32 27	14 27	33 1
6	12 44	29 6	12 59	29 40	13 13	30 13	13 27	30 47	13 42	31 21	13 56	31 54	14 11	32 28	14 25	33 1
8	12 42	29 7	12 57	29 40	13 11	30 14	13 26	30 47	13 40	31 21	13 54	31 54	14 9	32 28	14 23	33 1
10	12 41	29 7	12 55	29 40	13 9	30 14	13 24	30 47	13 38	31 21	13 52	31 55	14 7	32 28	14 21	33 2
12	12 39	29 7	12 53	29 41	13 7	30 14	13 22	30 48	13 36	31 21	13 50	31 55	14 5	32 28	14 19	33 2
14	12 37	29 7	12 51	29 41	13 6	30 15	13 20	30 48	13 34	31 22	13 48	31 55	14 3	32 29	14 17	33 2
16	12 35	29 8	12 49	29 41	13 4	30 15	13 18	30 48	13 32	31 22	13 46	31 55	14 1	32 29	14 15	33 2
18	12 33	29 8	12 48	29 41	13 2	30 15	13 16	30 49	13 30	31 22	13 44	31 56	13 59	32 29	14 13	33 3
20	12 32	29 8	12 46	29 42	13 0	30 15	13 14	30 49	13 28	31 22	13 42	31 56	13 57	32 29	14 11	33 3
22	12 30	29 8	12 44	29 42	12 58	30 16	13 12	30 49	13 26	31 23	13 41	31 56	13 55	32 30	14 9	33 3
24	12 28	29 9	12 42	29 42	12 56	30 16	13 10	30 49	13 24	31 23	13 39	31 56	13 53	32 30	14 7	33 4
26	12 26	29 9	12 40	29 42	12 54	30 16	13 8	30 50	13 23	31 23	13 37	31 57	13 51	32 30	14 5	33 4
28	12 24	29 9	12 38	29 43	12 53	30 16	13 7	30 50	13 21	31 23	13 35	31 57	13 49	32 31	14 3	33 4
30	12 23	29 9	12 37	29 43	12 51	30 17	13 5	30 50	13 19	31 24	13 33	31 57	13 47	32 31	14 1	33 4
32	12 21	29 10	12 35	29 43	12 49	30 17	13 3	30 50	13 17	31 24	13 31	31 57	13 45	32 31	13 59	33 5
34	12 19	29 10	12 33	29 43	12 47	30 17	13 1	30 51	13 15	31 24	13 29	31 58	13 43	32 31	13 57	33 5
36	12 17	29 10	12 31	29 44	12 45	30 17	12 59	30 51	13 13	31 24	13 27	31 58	13 41	32 32	13 55	33 5
38	12 15	29 10	12 29	29 44	12 43	30 18	12 57	30 51	13 11	31 25	13 25	31 58	13 39	32 32	13 53	33 5
40	12 14	29 11	12 27	29 44	12 41	30 18	12 55	30 51	13 9	31 25	13 23	31 58	13 37	32 32	13 50	33 6
42	12 12	29 11	12 26	29 44	12 40	30 18	12 53	30 52	13 7	31 25	13 21	31 59	13 35	32 32	13 48	33 6
44	12 10	29 11	12 24	29 45	12 38	30 18	12 51	30 52	13 5	31 25	13 19	31 59	13 33	32 33	13 46	33 6
46	12 8	29 11	12 22	29 45	12 36	30 19	12 49	30 52	13 3	31 26	13 17	31 59	13 31	32 33	13 44	33 7
48	12 6	29 12	12 20	29 45	12 34	30 19	12 48	30 52	13 1	31 26	13 15	32 0	13 29	32 33	13 42	33 7
50	12 5	29 12	12 18	29 45	12 32	30 19	12 46	30 53	12 59	31 26	13 13	32 0	13 27	32 34	13 40	33 7
52	12 3	29 12	12 17	29 46	12 30	30 19	12 44	30 53	12 57	31 27	13 11	32 0	13 25	32 34	13 38	33 7
54	12 1	29 12	12 15	29 46	12 28	30 20	12 42	30 53	12 55	31 27	13 9	32 0	13 23	32 34	13 36	33 8
56	11 59	29 13	12 13	29 46	12 26	30 20	12 40	30 53	12 53	31 27	13 7	32 1	13 21	32 34	13 34	33 8
58	11 57	29 13	12 11	29 46	12 25	30 20	12 38	30 54	12 52	31 27	13 5	32 1	13 19	32 35	13 32	33 8
77°	54′		55′		56′		57′		58′		59′		60′		61′	
0′	11 56	29 13	12 9	29 47	12 23	30 20	12 36	30 54	12 50	31 28	13 3	32 1	13 17	32 35	13 30	33 8
2	11 54	29 13	12 7	29 47	12 21	30 21	12 34	30 54	12 48	31 28	13 1	32 1	13 15	32 35	13 28	33 9
4	11 52	29 14	12 5	29 47	12 19	30 21	12 32	30 54	12 46	31 28	12 59	32 2	13 13	32 35	13 26	33 9
6	11 50	29 14	12 4	29 47	12 17	30 21	12 30	30 55	12 44	31 28	12 57	32 2	13 11	32 36	13 24	33 9
8	11 48	29 14	12 2	29 48	12 15	30 21	12 29	30 55	12 42	31 29	12 55	32 2	13 9	32 36	13 22	33 10
10	11 47	29 14	12 0	29 48	12 13	30 22	12 27	30 55	12 40	31 29	12 53	32 2	13 7	32 36	13 20	33 10
12	11 45	29 14	11 58	29 48	12 11	30 22	12 25	30 55	12 38	31 29	12 51	32 3	13 5	32 36	13 18	33 10
14	11 43	29 15	11 56	29 48	12 10	30 22	12 23	30 56	12 36	31 29	12 49	32 3	13 3	32 37	13 16	33 10
16	11 41	29 15	11 54	29 49	12 8	30 22	12 21	30 56	12 34	31 30	12 47	32 3	13 1	32 37	13 14	33 11
18	11 39	29 15	11 52	29 49	12 6	30 23	12 19	30 56	12 32	31 30	12 45	32 4	12 59	32 37	13 12	33 11
20	11 38	29 15	11 51	29 49	12 4	30 23	12 17	30 56	12 30	31 30	12 43	32 4	12 56	32 37	13 10	33 11
22	11 36	29 16	11 49	29 49	12 2	30 23	12 15	30 57	12 28	31 30	12 41	32 4	12 54	32 38	13 8	33 11
24	11 34	29 16	11 47	29 50	12 0	30 23	12 13	30 57	12 26	31 31	12 39	32 4	12 52	32 38	13 6	33 12
26	11 32	29 16	11 45	29 50	11 58	30 24	12 11	30 57	12 24	31 31	12 37	32 5	12 50	32 38	13 4	33 12
28	11 30	29 16	11 43	29 50	11 56	30 24	12 9	30 57	12 22	31 31	12 35	32 5	12 48	32 39	13 2	33 12
30	11 29	29 17	11 42	29 50	11 55	30 24	12 8	30 58	12 20	31 31	12 33	32 5	12 46	32 39	12 59	33 12
32	11 27	29 17	11 40	29 50	11 53	30 24	12 6	30 58	12 19	31 32	12 32	32 5	12 44	32 39	12 57	33 13
34	11 25	29 17	11 38	29 51	11 51	30 24	12 4	30 58	12 17	31 32	12 30	32 6	12 42	32 39	12 55	33 13
36	11 23	29 17	11 36	29 51	11 49	30 25	12 2	30 58	12 15	31 32	12 28	32 6	12 40	32 40	12 53	33 13
38	11 21	29 17	11 34	29 51	11 47	30 25	12 0	30 59	12 13	31 32	12 26	32 6	12 38	32 40	12 51	33 14
40	11 20	29 18	11 32	29 51	11 45	30 25	11 58	30 59	12 11	31 33	12 24	32 6	12 36	32 40	12 49	33 14
42	11 18	29 18	11 31	29 52	11 43	30 25	11 56	30 59	12 9	31 33	12 22	32 7	12 34	32 40	12 47	33 14
44	11 16	29 18	11 29	29 52	11 41	30 26	11 54	30 59	12 7	31 33	12 20	32 7	12 32	32 41	12 45	33 14
46	11 14	29 18	11 27	29 52	11 40	30 26	11 52	31 0	12 5	31 33	12 18	32 7	12 30	32 41	12 43	33 15
48	11 12	29 19	11 25	29 52	11 38	30 26	11 50	31 0	12 3	31 34	12 16	32 7	12 28	32 41	12 41	33 15
50	11 11	29 19	11 23	29 53	11 36	30 26	11 48	31 0	12 1	31 34	12 14	32 8	12 26	32 41	12 39	33 15
52	11 9	29 19	11 21	29 53	11 34	30 27	11 47	31 0	11 59	31 34	12 12	32 8	12 24	32 42	12 37	33 15
54	11 7	29 19	11 20	29 53	11 32	30 27	11 45	31 1	11 57	31 34	12 10	32 8	12 22	32 42	12 35	33 16
56	11 5	29 20	11 18	29 53	11 30	30 27	11 43	31 1	11 55	31 35	12 8	32 8	12 20	32 42	12 33	33 16
58	11 3	29 20	11 16	29 54	11 28	30 27	11 41	31 1	11 53	31 35	12 6	32 9	12 18	32 42	12 31	33 16

Seconds of H. P.	Cor	A
″	″	″
1	0	1
2	0	1
3	1	2
4	1	2
5	1	3
6	1	3
7	2	4
8	2	4
9	2	5
10	2	6
11	2	6
12	3	7
13	3	7
14	3	8
15	3	8
16	4	9
17	4	9
18	4	10
19	4	11
20	4	11
21	5	12
22	5	12
23	5	13
24	5	13
25	6	14
26	6	15
27	6	15
28	6	16
29	7	16
30	7	17
31	7	17
32	7	18
33	7	18
34	8	19
35	8	20
36	8	20
37	8	21
38	9	21
39	9	22
40	9	22
41	9	23
42	9	23
43	10	24
44	10	25
45	10	25
46	10	26
47	11	26
48	11	27
49	11	27
50	11	28
51	11	28
52	12	29
53	12	30
54	12	30
55	12	31
56	13	31
57	13	32
58	13	32
59	13	33
60	14	33
70	5	0
90	5	0

Alt.	☉	≡ A *
	″	″
3	8	8
4	6	5
5	4	4
6	3	3
7	3	2
8	2	2
9	2	1
10	2	1
20	2	0
30	3	0
10	3	0
50	4	0
60	4	0
70	5	0
90	5	0

(78° and 79°) Correction of the Moon's Altitude, and the Aux. Angle A.

App. Alt.	Minutes of Moon's Hor. Parallax. 54′		55′		56′		57′		58′		59′		60′		61′	
78°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
0′	11 1	29 20	11 14	29 54	11 26	30 28	11 39	31 1	11 51	31 35	12 4	32 9	12 16	32 43	12 29	33 16
2	11 0	29 20	11 12	29 54	11 25	30 28	11 37	31 2	11 49	31 35	12 2	32 9	12 14	32 43	12 27	33 17
4	10 58	29 20	11 10	29 54	11 23	30 28	11 35	31 2	11 48	31 36	12 0	32 9	12 12	32 43	12 25	33 17
6	10 56	29 21	11 8	29 54	11 21	30 28	11 33	31 2	11 46	31 36	11 58	32 10	12 10	32 43	12 23	33 17
8	10 54	29 21	11 7	29 55	11 19	30 28	11 31	31 2	11 44	31 36	11 56	32 10	12 8	32 44	12 21	33 17
10	10 52	29 21	11 5	29 55	11 17	30 29	11 29	31 2	11 42	31 36	11 54	32 10	12 6	32 44	12 19	33 18
12	10 51	29 21	11 3	29 55	11 15	30 29	11 27	31 3	11 40	31 36	11 52	32 10	12 4	32 44	12 17	33 18
14	10 49	29 22	11 1	29 55	11 13	30 29	11 26	31 3	11 38	31 37	11 50	32 11	12 2	32 44	12 15	33 18
16	10 47	29 22	10 59	29 56	11 11	30 29	11 24	31 3	11 36	31 37	11 48	32 11	12 0	32 45	12 12	33 18
18	10 45	29 22	10 57	29 56	11 10	30 30	11 22	31 3	11 34	31 37	11 46	32 11	11 58	32 45	12 10	33 19
20	10 43	29 22	10 55	29 56	11 8	30 30	11 20	31 4	11 32	31 37	11 44	32 11	11 56	32 45	12 8	33 19
22	10 42	29 22	10 54	29 56	11 6	30 30	11 18	31 4	11 30	31 38	11 42	32 11	11 54	32 45	12 6	33 19
24	10 40	29 23	10 52	29 56	11 4	30 30	11 16	31 4	11 28	31 38	11 40	32 12	11 52	32 45	12 4	33 19
26	10 38	29 23	10 50	29 57	11 2	30 30	11 14	31 4	11 26	31 38	11 38	32 12	11 50	32 46	12 2	33 20
28	10 36	29 23	10 48	29 57	11 0	30 31	11 12	31 5	11 24	31 38	11 36	32 12	11 48	32 46	12 0	33 20
30	10 34	29 23	10 46	29 57	10 58	30 31	11 10	31 5	11 22	31 39	11 34	32 12	11 46	32 46	11 58	33 20
32	10 33	29 24	10 44	29 57	10 56	30 31	11 8	31 5	11 20	31 39	11 32	32 13	11 44	32 46	11 56	33 20
34	10 31	29 24	10 43	29 58	10 55	30 31	11 6	31 5	11 18	31 39	11 30	32 13	11 42	32 47	11 54	33 21
36	10 29	29 24	10 41	29 58	10 53	30 32	11 5	31 5	11 16	31 39	11 28	32 13	11 40	32 47	11 52	33 21
38	10 27	29 24	10 39	29 58	10 51	30 32	11 3	31 6	11 14	31 40	11 26	32 13	11 38	32 47	11 50	33 21
40	10 25	29 24	10 37	29 58	10 49	30 32	11 1	31 6	11 12	31 40	11 24	32 14	11 36	32 47	11 48	33 21
42	10 23	29 25	10 35	29 58	10 47	30 32	10 59	31 6	11 11	31 40	11 22	32 14	11 34	32 48	11 46	33 22
44	10 22	29 25	10 33	29 59	10 45	30 33	10 57	31 6	11 9	31 40	11 20	32 14	11 32	32 48	11 44	33 22
46	10 20	29 25	10 32	29 59	10 43	30 33	10 55	31 7	11 7	31 40	11 18	32 14	11 30	32 48	11 42	33 22
48	10 18	29 25	10 30	29 59	10 41	30 33	10 53	31 7	11 5	31 41	11 16	32 15	11 28	32 48	11 40	33 22
50	10 16	29 25	10 28	29 59	10 39	30 33	10 51	31 7	11 3	31 41	11 14	32 15	11 26	32 49	11 38	33 23
52	10 14	29 26	10 26	30 0	10 38	30 33	10 49	31 7	11 1	31 41	11 12	32 15	11 24	32 49	11 36	33 23
54	10 13	29 26	10 24	30 0	10 36	30 34	10 47	31 8	10 59	31 41	11 10	32 15	11 22	32 49	11 34	33 23
56	10 11	29 26	10 22	30 0	10 34	30 34	10 45	31 8	10 57	31 42	11 8	32 16	11 20	32 49	11 31	33 23
58	10 9	29 26	10 21	30 0	10 32	30 34	10 44	31 8	10 55	31 42	11 6	32 16	11 18	32 50	11 29	33 24
79°	54′		55′		56′		57′		58′		59′		60′		61′	
0′	10 7	29 27	10 19	30 0	10 30	30 34	10 42	31 8	10 53	31 42	11 4	32 16	11 16	32 50	11 27	33 24
2	10 5	29 27	10 17	30 1	10 28	30 35	10 40	31 8	10 51	31 42	11 2	32 16	11 14	32 50	11 25	33 24
4	10 4	29 27	10 15	30 1	10 26	30 35	10 38	31 9	10 49	31 42	11 0	32 16	11 12	32 50	11 23	33 24
6	10 2	29 27	10 13	30 1	10 24	30 35	10 36	31 9	10 47	31 43	10 58	32 17	11 10	32 50	11 21	33 24
8	10 0	29 27	10 11	30 1	10 23	30 35	10 34	31 9	10 45	31 43	10 56	32 17	11 8	32 51	11 19	33 25
10	9 58	29 28	10 9	30 1	10 21	30 35	10 32	31 9	10 43	31 43	10 54	32 17	11 6	32 51	11 17	33 25
12	9 56	29 28	10 8	30 2	10 19	30 36	10 30	31 9	10 41	31 43	10 52	32 17	11 4	32 51	11 15	33 25
14	9 54	29 28	10 6	30 2	10 17	30 36	10 28	31 10	10 39	31 43	10 50	32 17	11 2	32 51	11 13	33 25
16	9 53	29 28	10 4	30 2	10 15	30 36	10 26	31 10	10 37	31 44	10 48	32 18	11 0	32 51	11 11	33 25
18	9 51	29 28	10 2	30 2	10 13	30 36	10 24	31 10	10 35	31 44	10 46	32 18	10 58	32 52	11 9	33 26
20	9 49	29 28	10 0	30 2	10 11	30 36	10 22	31 10	10 33	31 44	10 44	32 18	10 56	32 52	11 7	33 26
22	9 47	29 29	9 58	30 3	10 9	30 36	10 20	31 10	10 31	31 44	10 43	32 18	10 54	32 52	11 5	33 26
24	9 45	29 29	9 56	30 3	10 7	30 37	10 18	31 11	10 29	31 45	10 41	32 18	10 52	32 52	11 3	33 26
26	9 44	29 29	9 55	30 3	10 6	30 37	10 17	31 11	10 28	31 45	10 39	32 19	10 50	32 53	11 1	33 27
28	9 42	29 29	9 53	30 3	10 4	30 37	10 15	31 11	10 26	31 45	10 37	32 19	10 47	32 53	10 58	33 27
30	9 40	29 29	9 51	30 3	10 2	30 37	10 13	31 11	10 24	31 45	10 35	32 19	10 45	32 53	10 56	33 27
32	9 38	29 30	9 49	30 4	10 0	30 37	10 11	31 11	10 22	31 45	10 33	32 19	10 43	32 53	10 54	33 27
34	9 36	29 30	9 47	30 4	9 58	30 38	10 9	31 12	10 20	31 46	10 31	32 20	10 41	32 53	10 52	33 27
36	9 34	29 30	9 45	30 4	9 56	30 38	10 7	31 12	10 18	31 46	10 29	32 20	10 39	32 54	10 50	33 28
38	9 33	29 30	9 43	30 4	9 54	30 38	10 5	31 12	10 16	31 46	10 27	32 20	10 37	32 54	10 48	33 28
40	9 31	29 30	9 42	30 4	9 52	30 38	10 3	31 12	10 14	31 46	10 25	32 20	10 36	32 54	10 46	33 28
42	9 29	29 31	9 40	30 5	9 50	30 38	10 1	31 12	10 12	31 46	10 23	32 20	10 33	32 54	10 44	33 28
44	9 27	29 31	9 38	30 5	9 49	30 39	9 59	31 13	10 10	31 47	10 21	32 21	10 31	32 55	10 42	33 29
46	9 25	29 31	9 36	30 5	9 47	30 39	9 57	31 13	10 8	31 47	10 19	32 21	10 29	32 55	10 40	33 29
48	9 24	29 31	9 34	30 5	9 45	30 39	9 55	31 13	10 6	31 47	10 17	32 21	10 27	32 55	10 38	33 29
50	9 22	29 31	9 32	30 5	9 43	30 39	9 53	31 13	10 4	31 47	10 15	32 21	10 25	32 55	10 36	33 29
52	9 20	29 32	9 30	30 6	9 41	30 39	9 52	31 13	10 2	31 47	10 13	32 21	10 23	32 55	10 34	33 29
54	9 18	29 32	9 29	30 6	9 39	30 40	9 50	31 14	10 0	31 48	10 11	32 22	10 21	32 56	10 32	33 30
56	9 16	29 32	9 27	30 6	9 37	30 40	9 48	31 14	9 58	31 48	10 9	32 22	10 19	32 56	10 30	33 30
58	9 14	29 32	9 25	30 6	9 35	30 40	9 46	31 14	9 56	31 48	10 7	32 22	10 17	32 56	10 28	33 30

Seconds of H. P.		
″	Corr.	A
	″	″
1	0	1
2	0	1
3	1	2
4	1	2
5	1	3
6	1	3
7	1	4
8	2	4
9	2	5
10	2	6
11	2	6
12	2	7
13	2	7
14	3	8
15	3	8
16	3	9
17	3	9
18	3	10
19	4	11
20	4	11
21	4	12
22	4	12
23	4	13
24	5	13
25	5	14
26	5	15
27	5	15
28	5	16
29	6	16
30	6	17
31	6	17
32	6	18
33	6	18
34	7	19
35	7	20
36	7	20
37	7	21
38	7	21
39	7	22
40	8	22
41	8	23
42	8	23
43	8	24
44	8	25
45	9	25
46	9	26
47	9	26
48	9	27
49	9	27
50	10	28
51	10	28
52	10	29
53	10	30
54	10	30
55	11	31
56	11	31
57	11	32
58	11	32
59	11	33

App. Alt.	☽	A	☽	A
	′	″	′	″
3	8	8		
4	6	5		
5	4	4		
6	3	3		
7	3	2		
8	2	2		
9	2	1	1	1
10	2	1	1	1
20	2	0	1	0
30	3	0	1	0
40	3	0	1	0
50	4	0	1	0
60	4	0	1	0
70	5	0		
90	5	0		

Correction of the Moon's Altitude, and the Aux. Angle A. (80° and 81°)

App. Alt.	Minutes of Moon's Hor. Parallax. 54′		55		56′		57′		58′		59′		60′		61′	
80°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
0′	9 13	29 32	9 23	30 6	9 33	30 40	9 44	31 14	9 54	31 48	10 5	32 22	10 15	32 56	10 25	33 30
2	9 11	29 33	9 21	30 7	9 31	30 40	9 42	31 14	9 52	31 48	10 3	32 22	10 13	32 56	10 24	33 30
4	9 9	29 33	9 19	30 7	9 30	30 41	9 40	31 15	9 50	31 49	10 1	32 23	10 11	32 57	10 21	33 31
6	9 7	29 33	9 17	30 7	9 28	30 41	9 38	31 15	9 48	31 49	9 59	32 23	10 9	32 57	10 19	33 31
8	9 5	29 33	9 16	30 7	9 26	30 41	9 36	31 15	9 46	31 49	9 57	32 23	10 7	32 57	10 17	33 31
10	9 3	29 33	9 14	30 7	9 24	30 41	9 34	31 15	9 44	31 49	9 54	32 23	10 5	32 57	10 15	33 31
12	9 2	29 33	9 12	30 7	9 22	30 41	9 32	31 15	9 42	31 49	9 52	32 23	10 3	32 57	10 13	33 31
14	9 0	29 34	9 10	30 8	9 20	30 42	9 30	31 16	9 40	31 50	9 50	32 24	10 1	32 58	10 11	33 32
16	8 58	29 34	9 8	30 8	9 18	30 42	9 28	31 16	9 38	31 50	9 48	32 24	9 59	32 58	10 9	33 32
18	8 56	29 34	9 6	30 8	9 16	30 42	9 26	31 16	9 36	31 50	9 46	32 24	9 57	32 58	10 7	33 32
20	8 54	29 34	9 4	30 8	9 14	30 42	9 24	31 16	9 34	31 50	9 44	32 24	9 55	32 58	10 5	33 32
22	8 52	29 34	9 2	30 8	9 13	30 42	9 22	31 16	9 32	31 50	9 42	32 24	9 53	32 58	10 3	33 32
24	8 51	29 34	9 1	30 8	9 11	30 42	9 21	31 16	9 31	31 50	9 40	32 24	9 51	32 58	10 1	33 32
26	8 49	29 35	8 59	30 9	9 9	30 43	9 19	31 17	9 29	31 51	9 38	32 25	9 49	32 59	9 59	33 33
28	8 47	29 35	8 57	30 9	9 7	30 43	9 17	31 17	9 27	31 51	9 37	32 25	9 47	32 59	9 57	33 33
30	8 45	29 35	8 55	30 9	9 5	30 43	9 15	31 17	9 25	31 51	9 35	32 25	9 45	32 59	9 54	33 33
32	8 43	29 35	8 53	30 9	9 3	30 43	9 13	31 17	9 23	31 51	9 33	32 25	9 43	32 59	9 52	33 33
34	8 42	29 35	8 51	30 9	9 1	30 43	9 11	31 17	9 21	31 51	9 31	32 25	9 41	32 59	9 50	33 33
36	8 40	29 35	8 49	30 9	8 59	30 44	9 9	31 18	9 19	31 52	9 29	32 26	9 39	33 0	9 48	33 34
38	8 38	29 36	8 48	30 10	8 57	30 44	9 7	31 18	9 17	31 52	9 27	32 26	9 37	33 0	9 46	33 34
40	8 36	29 36	8 46	30 10	8 56	30 44	9 5	31 18	9 15	31 52	9 25	32 26	9 34	33 0	9 44	33 34
42	8 34	29 36	8 44	30 10	8 54	30 44	9 3	31 18	9 13	31 52	9 23	32 26	9 32	33 0	9 42	33 34
44	8 32	29 36	8 42	30 10	8 52	30 44	9 1	31 18	9 11	31 52	9 21	32 26	9 30	33 0	9 40	33 34
46	8 31	29 36	8 40	30 10	8 50	30 44	9 0	31 18	9 9	31 52	9 19	32 26	9 28	33 1	9 38	33 35
48	8 29	29 36	8 38	30 11	8 48	30 45	8 58	31 19	9 7	31 53	9 17	32 27	9 26	33 1	9 36	33 35
50	8 27	29 37	8 36	30 11	8 46	30 45	8 56	31 19	9 5	31 53	9 15	32 27	9 24	33 1	9 34	33 35
52	8 25	29 37	8 35	30 11	8 44	30 45	8 54	31 19	9 3	31 53	9 13	32 27	9 22	33 1	9 32	33 35
54	8 23	29 37	8 33	30 11	8 42	30 45	8 52	31 19	9 1	31 53	9 11	32 27	9 20	33 1	9 30	33 35
56	8 21	29 37	8 31	30 11	8 40	30 45	8 50	31 19	8 59	31 53	9 9	32 27	9 18	33 1	9 28	33 36
58	8 20	29 37	8 29	30 11	8 38	30 45	8 48	31 20	8 57	31 54	9 7	32 28	9 16	33 2	9 26	33 36
81°	54′		55′		56′		57′		58′		59′		60′		61′	
0′	8 18	29 37	8 27	30 12	8 37	30 46	8 46	31 20	8 55	31 54	9 5	32 28	9 14	33 2	9 24	33 36
2	8 16	29 38	8 25	30 12	8 35	30 46	8 44	31 20	8 53	31 54	9 3	32 28	9 13	33 2	9 22	33 36
4	8 14	29 38	8 23	30 12	8 33	30 46	8 42	31 20	8 51	31 54	9 1	32 28	9 10	33 2	9 19	33 36
6	8 12	29 38	8 22	30 12	8 31	30 46	8 40	31 20	8 49	31 54	8 59	32 28	9 8	33 2	9 17	33 36
8	8 10	29 38	8 20	30 12	8 29	30 46	8 38	31 20	8 47	31 54	8 57	32 28	9 6	33 3	9 15	33 37
10	8 9	29 38	8 18	30 12	8 27	30 46	8 36	31 20	8 45	31 55	8 55	32 29	9 4	33 3	9 13	33 37
12	8 7	29 38	8 16	30 12	8 25	30 47	8 34	31 21	8 44	31 55	8 53	32 29	9 2	33 3	9 11	33 37
14	8 5	29 39	8 14	30 13	8 23	30 47	8 32	31 21	8 42	31 55	8 51	32 29	9 0	33 3	9 9	33 37
16	8 3	29 39	8 12	30 13	8 21	30 47	8 30	31 21	8 40	31 55	8 49	32 29	8 58	33 3	9 7	33 37
18	8 1	29 39	8 10	30 13	8 19	30 47	8 29	31 21	8 38	31 55	8 47	32 29	8 56	33 3	9 5	33 38
20	7 59	29 39	8 8	30 13	8 17	30 47	8 27	31 21	8 36	31 55	8 45	32 29	8 54	33 4	9 3	33 38
22	7 58	29 39	8 7	30 13	8 16	30 47	8 25	31 21	8 34	31 56	8 43	32 30	8 52	33 4	9 1	33 38
24	7 56	29 39	8 5	30 13	8 14	30 48	8 23	31 22	8 32	31 56	8 41	32 30	8 50	33 4	8 59	33 38
26	7 54	29 39	8 3	30 14	8 12	30 48	8 21	31 22	8 30	31 56	8 39	32 30	8 48	33 4	8 57	33 38
28	7 52	29 40	8 1	30 14	8 10	30 48	8 19	31 22	8 28	31 56	8 37	32 30	8 46	33 4	8 55	33 38
30	7 50	29 40	7 59	30 14	8 8	30 48	8 17	31 22	8 26	31 56	8 35	32 30	8 43	33 4	8 52	33 39
32	7 48	29 40	7 57	30 14	8 6	30 48	8 15	31 22	8 24	31 56	8 33	32 30	8 41	33 5	8 50	33 39
34	7 47	29 40	7 55	30 14	8 4	30 48	8 13	31 22	8 22	31 57	8 31	32 31	8 39	33 5	8 48	33 39
36	7 45	29 40	7 54	30 14	8 2	30 48	8 11	31 23	8 20	31 57	8 29	32 31	8 37	33 5	8 46	33 39
38	7 43	29 40	7 52	30 14	8 0	30 49	8 9	31 23	8 18	31 57	8 27	32 31	8 35	33 5	8 44	33 39
40	7 41	29 40	7 50	30 15	7 58	30 49	8 7	31 23	8 16	31 57	8 25	32 31	8 33	33 5	8 42	33 39
42	7 39	29 41	7 48	30 15	7 57	30 49	8 5	31 23	8 14	31 57	8 23	32 31	8 31	33 5	8 40	33 40
44	7 37	29 41	7 46	30 15	7 55	30 49	8 3	31 23	8 12	31 57	8 21	32 31	8 29	33 6	8 38	33 40
46	7 36	29 41	7 44	30 15	7 53	30 49	8 1	31 23	8 10	31 58	8 19	32 32	8 27	33 6	8 36	33 40
48	7 34	29 41	7 42	30 15	7 51	30 49	7 59	31 24	8 8	31 58	8 17	32 32	8 25	33 6	8 34	33 40
50	7 32	29 41	7 40	30 15	7 49	30 50	7 58	31 24	8 6	31 58	8 15	32 32	8 23	33 6	8 32	33 40
52	7 30	29 41	7 39	30 16	7 47	30 50	7 56	31 24	8 4	31 58	8 13	32 32	8 21	33 6	8 30	33 40
54	7 28	29 42	7 37	30 16	7 45	30 50	7 54	31 24	8 2	31 58	8 11	32 32	8 19	33 6	8 28	33 41
56	7 26	29 42	7 35	30 16	7 43	30 50	7 52	31 24	8 0	31 58	8 9	32 33	8 17	33 7	8 25	33 41
58	7 25	29 42	7 33	30 16	7 41	30 50	7 50	31 24	7 58	31 59	8 7	32 33	8 15	33 7	8 23	33 41

Seconds of H. P.	Corr.	A
″	″	″
1	0	1
2	0	1
3	0	2
4	1	2
5	1	3
6	1	3
7	1	4
8	1	5
9	1	5
10	2	6
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12	2	7
13	2	7
14	2	8
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16	3	9
17	3	10
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21	3	12
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24	4	14
25	4	14
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29	5	17
30	5	17
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32	5	18
33	5	19
34	5	20
35	6	20
36	6	21
37	6	21
38	6	22
39	6	22
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41	6	24
42	7	24
43	7	25
44	7	25
45	7	26
46	7	26
47	7	27
48	8	28
49	8	28
50	8	29
51	8	29
52	8	30
53	8	30
54	9	31
55	9	32
56	9	32
57	9	33
58	9	33
59	9	34

Alt.	☉	●
°	A	A
3	8	8
4	6	5
5	4	4
6	3	3
7	3	2
8	2	2
9	2	1
10	2	1
20	2	0
30	3	0
40	3	0
50	4	0
60	4	0
70	5	0
90	5	0

(82° and 83°) Correction of the Moon's Altitude, and the Aux. Angle A.

App. Alt.	Minutes of Moon's Hor. Parallax. 54′		55′		56′		57′		58′		59′		60′		61′	
82°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
0′	7 23	29 42	7 31	30 16	7 39	30 50	7 48	31 25	7 56	31 59	8 5	32 33	8 13	33 7	8 21	33 41
2	7 21	29 42	7 29	30 16	7 38	30 51	7 46	31 25	7 54	31 59	8 3	32 33	8 11	33 7	8 19	33 41
4	7 19	29 42	7 27	30 17	7 36	30 51	7 44	31 25	7 52	31 59	8 1	32 33	8 9	33 7	8 17	33 42
6	7 17	29 43	7 26	30 17	7 34	30 51	7 42	31 25	7 50	31 59	7 59	32 33	8 7	33 7	8 15	33 42
8	7 15	29 43	7 24	30 17	7 32	30 51	7 40	31 25	7 48	31 59	7 57	32 33	8 5	33 8	8 13	33 42
10	7 14	29 43	7 22	30 17	7 30	30 51	7 38	31 25	7 46	31 59	7 55	32 34	8 3	33 8	8 11	33 42
12	7 12	29 43	7 20	30 17	7 28	30 51	7 36	31 25	7 44	32 0	7 53	32 34	8 1	33 8	8 9	33 42
14	7 10	29 43	7 18	30 17	7 26	30 51	7 34	31 26	7 42	32 0	7 50	32 34	7 59	33 8	8 7	33 42
16	7 8	29 43	7 16	30 17	7 24	30 52	7 32	31 26	7 40	32 0	7 49	32 34	7 57	33 8	8 5	33 42
18	7 6	29 43	7 14	30 18	7 22	30 52	7 30	31 26	7 38	32 0	7 47	32 34	7 55	33 8	8 3	33 43
20	7 4	29 43	7 12	30 18	7 20	30 52	7 28	31 26	7 36	32 0	7 44	32 34	7 52	33 9	8 0	33 43
22	7 3	29 44	7 11	30 18	7 18	30 52	7 26	31 26	7 35	32 0	7 42	32 35	7 50	33 9	7 58	33 43
24	7 1	29 44	7 9	30 18	7 17	30 52	7 25	31 26	7 33	32 0	7 40	32 35	7 48	33 9	7 56	33 43
26	6 59	29 44	7 7	30 18	7 15	30 52	7 23	31 27	7 31	32 1	7 38	32 35	7 46	33 9	7 54	33 43
28	6 57	29 44	7 5	30 18	7 13	30 53	7 21	31 27	7 29	32 1	7 36	32 35	7 44	33 9	7 52	33 43
30	6 55	29 44	7 3	30 18	7 11	30 53	7 19	31 27	7 27	32 1	7 34	32 35	7 42	33 9	7 50	33 44
32	6 53	29 44	7 1	30 18	7 9	30 53	7 17	31 27	7 25	32 1	7 32	32 35	7 40	33 10	7 48	33 44
34	6 52	29 44	6 59	30 19	7 7	30 53	7 15	31 27	7 23	32 1	7 30	32 35	7 38	33 10	7 46	33 44
36	6 50	29 45	6 58	30 19	7 5	30 53	7 13	31 27	7 21	32 1	7 28	32 36	7 36	33 10	7 44	33 44
38	6 48	29 45	6 56	30 19	7 3	30 53	7 11	31 27	7 19	32 2	7 26	32 36	7 34	33 10	7 42	33 44
40	6 46	29 45	6 54	30 19	7 1	30 53	7 9	31 27	7 17	32 2	7 24	32 36	7 32	33 10	7 40	33 44
42	6 44	29 45	6 52	30 19	6 59	30 53	7 7	31 28	7 15	32 2	7 22	32 36	7 30	33 10	7 38	33 45
44	6 42	29 45	6 50	30 19	6 58	30 54	7 5	31 28	7 13	32 2	7 20	32 36	7 28	33 11	7 36	33 45
46	6 41	29 45	6 48	30 19	6 56	30 54	7 3	31 28	7 11	32 2	7 18	32 36	7 26	33 11	7 34	33 45
48	6 39	29 45	6 46	30 20	6 54	30 54	7 1	31 28	7 9	32 2	7 16	32 37	7 24	33 11	7 31	33 45
50	6 37	29 45	6 44	30 20	6 52	30 54	6 59	31 28	7 7	32 2	7 14	32 37	7 22	33 11	7 29	33 45
52	6 35	29 46	6 43	30 20	6 50	30 54	6 57	31 28	7 5	32 3	7 12	32 37	7 20	33 11	7 27	33 45
54	6 33	29 46	6 41	30 20	6 48	30 54	6 56	31 29	7 3	32 3	7 10	32 37	7 18	33 11	7 25	33 46
56	6 31	29 46	6 39	30 20	6 46	30 54	6 54	31 29	7 1	32 3	7 8	32 37	7 16	33 11	7 23	33 46
58	6 30	29 46	6 37	30 20	6 44	30 53	6 52	31 29	6 59	32 3	7 6	32 37	7 14	33 12	7 21	33 46
83°	54′		55′		56′		57′		58′		59′		60′		61′	
0′	6 28	29 46	6 35	30 20	6 42	30 55	6 50	31 29	6 57	32 3	7 4	32 38	7 12	33 12	7 19	33 46
2	6 26	29 46	6 33	30 21	6 40	30 55	6 48	31 29	6 55	32 3	7 2	32 38	7 10	33 12	7 17	33 46
4	6 24	29 46	6 31	30 21	6 39	30 55	6 46	31 29	6 53	32 4	7 0	32 38	7 7	33 12	7 15	33 46
6	6 22	29 47	6 29	30 21	6 37	30 55	6 44	31 29	6 51	32 4	6 58	32 38	7 5	33 12	7 13	33 47
8	6 20	29 47	6 28	30 21	6 35	30 55	6 42	31 30	6 49	32 4	6 56	32 38	7 3	33 12	7 11	33 47
10	6 19	29 47	6 26	30 21	6 33	30 55	6 40	31 30	6 47	32 4	6 54	32 38	7 1	33 12	7 8	33 47
12	6 17	29 47	6 24	30 21	6 31	30 56	6 38	31 30	6 45	32 4	6 52	32 38	6 59	33 13	7 6	33 47
14	6 15	29 47	6 22	30 21	6 29	30 56	6 36	31 30	6 43	32 4	6 50	32 39	6 57	33 13	7 4	33 47
16	6 13	29 47	6 20	30 22	6 27	30 56	6 34	31 30	6 41	32 4	6 48	32 39	6 55	33 13	7 2	33 47
18	6 11	29 47	6 18	30 22	6 25	30 56	6 32	31 30	6 39	32 4	6 46	32 39	6 53	33 13	7 0	33 47
20	6 9	29 47	6 16	30 22	6 23	30 56	6 30	31 30	6 37	32 5	6 44	32 39	6 51	33 13	6 58	33 47
22	6 8	29 48	6 14	30 22	6 21	30 56	6 28	31 31	6 35	32 5	6 42	32 39	6 49	33 13	6 56	33 48
24	6 6	29 48	6 13	30 22	6 19	30 56	6 26	31 31	6 33	32 5	6 40	32 39	6 47	33 13	6 54	33 48
26	6 4	29 48	6 11	30 22	6 18	30 56	6 24	31 31	6 31	32 5	6 38	32 39	6 45	33 14	6 52	33 48
28	6 2	29 48	6 9	30 22	6 16	30 57	6 22	31 31	6 29	32 5	6 36	32 39	6 43	33 14	6 50	33 48
30	6 0	29 48	6 7	30 22	6 14	30 57	6 20	31 31	6 27	32 5	6 34	32 40	6 41	33 14	6 48	33 48
32	5 58	29 48	6 5	30 23	6 12	30 57	6 19	31 31	6 25	32 5	6 32	32 40	6 39	33 14	6 46	33 48
34	5 57	29 48	6 3	30 23	6 10	30 57	6 17	31 31	6 23	32 6	6 30	32 40	6 37	33 14	6 44	33 48
36	5 55	29 49	6 1	30 23	6 8	30 57	6 15	31 31	6 21	32 6	6 28	32 40	6 35	33 14	6 41	33 49
38	5 53	29 49	5 59	30 23	6 6	30 57	6 13	31 32	6 19	32 6	6 26	32 40	6 33	33 14	6 39	33 49
40	5 51	29 49	5 58	30 23	6 4	30 57	6 11	31 32	6 17	32 6	6 24	32 40	6 31	33 15	6 37	33 49
42	5 49	29 49	5 56	30 23	6 2	30 58	6 9	31 32	6 15	32 6	6 22	32 40	6 29	33 15	6 35	33 49
44	5 47	29 49	5 54	30 23	6 0	30 58	6 7	31 32	6 13	32 6	6 20	32 41	6 27	33 15	6 33	33 49
46	5 46	29 49	5 52	30 24	5 58	30 58	6 5	31 32	6 12	32 6	6 18	32 41	6 25	33 15	6 31	33 49
48	5 44	29 49	5 50	30 24	5 57	30 58	6 3	31 32	6 10	32 7	6 16	32 41	6 22	33 15	6 29	33 49
50	5 42	29 49	5 48	30 24	5 55	30 58	6 1	31 32	6 8	32 7	6 14	32 41	6 20	33 15	6 27	33 50
52	5 40	29 50	5 46	30 24	5 53	30 58	5 59	31 33	6 6	32 7	6 12	32 41	6 18	33 15	6 25	33 50
54	5 38	29 50	5 45	30 24	5 51	30 58	5 57	31 33	6 4	32 7	6 10	32 41	6 16	33 16	6 23	33 50
56	5 36	29 50	5 43	30 24	5 49	30 59	5 55	31 33	6 2	32 7	6 8	32 41	6 14	33 16	6 21	33 50
58	5 35	29 50	5 41	30 24	5 47	30 59	5 53	31 33	6 0	32 7	6 6	32 42	6 12	33 16	6 19	33 50

Seconds of H. P.

″	Sec.	A ′
1	0	1
2	0	1
3	0	2
4	0	2
5	1	3
6	1	3
7	1	4
8	1	5
9	1	5
10	1	6
11	1	6
12	1	7
13	2	7
14	2	8
15	2	9
16	2	9
17	2	10
18	2	10
19	2	11
20	2	11
21	3	12
22	3	13
23	3	13
24	3	14
25	3	14
26	3	15
27	3	16
28	3	16
29	4	17
30	4	17
31	4	18
32	4	18
33	4	19
34	4	20
35	4	20
36	4	21
37	5	21
38	5	22
39	5	22
40	5	23
41	5	24
42	5	24
43	5	25
44	5	25
45	6	26
46	6	26
47	6	27
48	6	28
49	6	28
50	6	29
51	6	29
52	6	30
53	7	30
54	7	31
55	7	32
56	7	32
57	7	33
58	7	33
59	7	34

Add. Alt.	☉	●
3	8	8
4	6	5
5	4	4
6	3	3
7	3	2
8	2	2
9	2	1
10	2	1
20	2	0
30	3	0
40	3	0
50	4	0
60	4	0
70	5	0
90	5	0

Correction of the Moon's Altitude, and the Aux. Angle A. (84° and 85°)

App. Alt.	Minutes of Moon's Hor. Parallax. 54′		55′		56′		57′		58′		59′		60′		61′	
84°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″
0′	5 33	29 50	5 39	30 24	5 45	30 59	5 51	31 33	5 58	32 7	6 5	32 42	6 10	33 16	6 17	33 50
2	5 31	29 50	5 37	30 25	5 43	30 59	5 50	31 33	5 56	32 7	6 2	32 42	6 8	33 16	6 15	33 50
4	5 29	29 50	5 35	30 25	5 41	30 59	5 48	31 33	5 54	32 8	6 0	32 42	6 6	33 16	6 12	33 51
6	5 27	29 50	5 33	30 25	5 39	30 59	5 46	31 33	5 52	32 8	5 58	32 42	6 4	33 16	6 10	33 51
8	5 25	29 51	5 31	30 25	5 38	30 59	5 44	31 33	5 50	32 8	5 56	32 42	6 2	33 16	6 8	33 51
10	5 23	29 51	5 30	30 25	5 36	30 59	5 42	31 34	5 48	32 8	5 54	32 42	6 0	33 16	6 6	33 51
12	5 22	29 51	5 28	30 25	5 34	30 59	5 40	31 34	5 46	32 8	5 52	32 42	5 58	33 17	6 4	33 51
14	5 20	29 51	5 26	30 25	5 32	30 59	5 38	31 34	5 44	32 8	5 50	32 42	5 56	33 17	6 2	33 51
16	5 18	29 51	5 24	30 25	5 30	31 0	5 36	31 34	5 42	32 8	5 48	32 42	5 54	33 17	6 0	33 51
18	5 16	29 51	5 22	30 25	5 28	31 0	5 34	31 34	5 40	32 8	5 46	32 43	5 52	33 17	5 58	33 51
20	5 14	29 51	5 20	30 25	5 26	31 0	5 32	31 34	5 38	32 8	5 44	32 43	5 50	33 17	5 56	33 51
22	5 12	29 51	5 18	30 26	5 24	31 0	5 30	31 34	5 36	32 9	5 42	32 43	5 48	33 17	5 54	33 52
24	5 11	29 51	5 16	30 26	5 22	31 0	5 28	31 34	5 34	32 9	5 40	32 43	5 46	33 17	5 52	33 52
26	5 9	29 51	5 14	30 26	5 20	31 0	5 26	31 34	5 32	32 9	5 38	32 43	5 44	33 17	5 49	33 52
28	5 7	29 52	5 13	30 26	5 18	31 0	5 24	31 35	5 30	32 9	5 36	32 43	5 42	33 17	5 47	33 52
30	5 5	29 52	5 11	30 26	5 17	31 0	5 22	31 35	5 28	32 9	5 34	32 43	5 40	33 18	5 45	33 52
32	5 3	29 52	5 9	30 26	5 15	31 0	5 20	31 35	5 26	32 9	5 32	32 43	5 37	33 18	5 43	33 52
34	5 1	29 52	5 7	30 26	5 13	31 1	5 18	31 35	5 24	32 9	5 30	32 43	5 35	33 18	5 41	33 52
36	4 59	29 52	5 5	30 26	5 11	31 1	5 16	31 35	5 22	32 9	5 28	32 44	5 33	33 18	5 39	33 52
38	4 58	29 52	5 3	30 26	5 9	31 1	5 15	31 35	5 20	32 9	5 26	32 44	5 31	33 18	5 37	33 52
40	4 56	29 52	5 1	30 26	5 7	31 1	5 13	31 35	5 18	32 9	5 24	32 44	5 29	33 18	5 35	33 52
42	4 54	29 52	5 0	30 27	5 5	31 1	5 11	31 35	5 16	32 10	5 22	32 44	5 27	33 18	5 33	33 53
44	4 52	29 52	4 58	30 27	5 3	31 1	5 9	31 35	5 14	32 10	5 20	32 44	5 25	33 18	5 31	33 53
46	4 50	29 52	4 56	30 27	5 1	31 1	5 7	31 35	5 12	32 10	5 18	32 44	5 23	33 19	5 29	33 53
48	4 48	29 53	4 54	30 27	4 59	31 1	5 5	31 36	5 10	32 10	5 16	32 44	5 21	33 19	5 27	33 53
50	4 47	29 53	4 52	30 27	4 57	31 1	5 3	31 36	5 8	32 10	5 14	32 44	5 19	33 19	5 24	33 53
52	4 45	29 53	4 50	30 27	4 56	31 1	5 1	31 36	5 6	32 10	5 12	32 44	5 17	33 19	5 22	33 53
54	4 43	29 53	4 48	30 27	4 54	31 2	4 59	31 36	5 4	32 10	5 10	32 45	5 15	33 19	5 20	33 53
56	4 41	29 53	4 46	30 27	4 52	31 2	4 57	31 36	5 2	32 10	5 8	32 45	5 13	33 19	5 18	33 53
58	4 39	29 53	4 44	30 27	4 50	31 2	4 55	31 36	5 0	32 10	5 6	32 45	5 11	33 19	5 16	33 53
85°	54′		55′		56′		57′		58′		59′		60′		61′	
0′	4 37	29 53	4 43	30 28	4 48	31 2	4 53	31 36	4 58	32 11	5 3	32 45	5 9	33 19	5 14	33 54
2	4 36	29 53	4 41	30 28	4 46	31 2	4 51	31 36	4 56	32 11	5 1	32 45	5 7	33 19	5 12	33 54
4	4 34	29 53	4 39	30 28	4 44	31 2	4 49	31 36	4 54	32 11	4 59	32 45	5 5	33 19	5 10	33 54
6	4 32	29 53	4 37	30 28	4 42	31 2	4 47	31 36	4 52	32 11	4 57	32 45	5 3	33 20	5 8	33 54
8	4 30	29 54	4 35	30 28	4 40	31 2	4 45	31 37	4 50	32 11	4 55	32 45	5 1	33 20	5 6	33 54
10	4 28	29 54	4 33	30 28	4 38	31 2	4 43	31 37	4 48	32 11	4 53	32 45	4 58	33 20	5 4	33 54
12	4 26	29 54	4 31	30 28	4 36	31 2	4 41	31 37	4 46	32 11	4 51	32 45	4 56	33 20	5 1	33 54
14	4 24	29 54	4 29	30 28	4 34	31 2	4 39	31 37	4 44	32 11	4 49	32 46	4 54	33 20	4 59	33 54
16	4 23	29 54	4 28	30 28	4 33	31 3	4 37	31 37	4 42	32 11	4 47	32 46	4 52	33 20	4 57	33 54
18	4 21	29 54	4 26	30 28	4 31	31 3	4 36	31 37	4 40	32 11	4 45	32 46	4 50	33 20	4 55	33 54
20	4 19	29 54	4 24	30 28	4 29	31 3	4 34	31 37	4 38	32 11	4 43	32 46	4 48	33 20	4 53	33 54
22	4 17	29 54	4 22	30 28	4 27	31 3	4 32	31 37	4 36	32 11	4 41	32 46	4 46	33 20	4 51	33 55
24	4 15	29 54	4 20	30 29	4 25	31 3	4 30	31 37	4 34	32 12	4 39	32 46	4 44	33 20	4 49	33 55
26	4 13	29 54	4 18	30 29	4 23	31 3	4 28	31 37	4 32	32 12	4 37	32 46	4 42	33 20	4 47	33 55
28	4 12	29 54	4 16	30 29	4 21	31 3	4 26	31 37	4 30	32 12	4 35	32 46	4 40	33 20	4 45	33 55
30	4 10	29 54	4 14	30 29	4 19	31 3	4 24	31 37	4 28	32 12	4 33	32 46	4 38	33 20	4 43	33 55
32	4 8	29 54	4 13	30 29	4 17	31 3	4 22	31 38	4 27	32 12	4 31	32 46	4 36	33 21	4 41	33 55
34	4 6	29 54	4 11	30 29	4 16	31 3	4 20	31 38	4 25	32 12	4 29	32 46	4 34	33 21	4 38	33 55
36	4 4	29 55	4 9	30 29	4 13	31 3	4 18	31 38	4 23	32 12	4 27	32 46	4 32	33 21	4 36	33 55
38	4 2	29 55	4 7	30 29	4 12	31 3	4 16	31 38	4 21	32 12	4 25	32 47	4 30	33 21	4 34	33 55
40	4 0	29 55	4 5	30 29	4 10	31 3	4 14	31 38	4 19	32 12	4 23	32 47	4 28	33 21	4 32	33 55
42	3 59	29 55	4 3	30 29	4 8	31 3	4 12	31 38	4 17	32 12	4 21	32 47	4 26	33 21	4 30	33 55
44	3 57	29 55	4 1	30 29	4 6	31 4	4 10	31 38	4 15	32 12	4 19	32 47	4 24	33 21	4 28	33 55
46	3 55	29 55	3 59	30 29	4 4	31 4	4 8	31 38	4 13	32 12	4 17	32 47	4 22	33 21	4 26	33 56
48	3 53	29 55	3 57	30 29	4 2	31 4	4 6	31 38	4 11	32 13	4 15	32 47	4 19	33 21	4 24	33 56
50	3 51	29 55	3 56	30 29	4 0	31 4	4 4	31 38	4 9	32 13	4 13	32 47	4 17	33 21	4 22	33 56
52	3 49	29 55	3 54	30 30	3 58	31 4	4 2	31 38	4 7	32 13	4 11	32 47	4 15	33 21	4 20	33 56
54	3 48	29 55	3 52	30 30	3 56	31 4	4 0	31 38	4 5	32 13	4 9	32 47	4 13	33 22	4 18	33 56
56	3 46	29 55	3 50	30 30	3 54	31 4	3 58	31 39	4 3	32 13	4 7	32 47	4 11	33 22	4 15	33 56
58	3 44	29 55	3 48	30 30	3 52	31 4	3 57	31 39	4 1	32 13	4 5	32 47	4 9	33 22	4 13	33 56

Seconds of H. P.	Corr.	A
″	″	″
1	0	1
2	0	1
3	0	2
4	0	2
5	0	3
6	1	3
7	1	4
8	1	5
9	1	5
10	1	6
11	1	6
12	1	7
13	1	7
14	1	8
15	1	9
16	1	9
17	2	10
18	2	10
19	2	11
20	2	11
21	2	12
22	2	13
23	2	13
24	2	14
25	2	14
26	2	15
27	2	16
28	3	16
29	3	17
30	3	17
31	3	18
32	3	18
33	3	19
34	3	20
35	3	20
36	3	21
37	3	21
38	3	22
39	4	22
40	4	23
41	4	24
42	4	24
43	4	25
44	4	25
45	4	26
46	4	26
47	4	27
48	4	28
49	4	28
50	5	29
51	5	29
52	5	30
53	5	30
54	5	31
55	5	32
56	5	32
57	5	33
58	5	33
59	5	34
= Alt. ☉	= A	= A ●
3	5	8
4	5	5
5	4	4
6	3	3
7	3	2
8	2	2
9	2	1
10	2	1
20	2	0
30	3	0
40	3	0
50	4	0
60	4	0
70	5	0
90	5	0

(86° and 87°) Correction of the Moon's Altitude, and the Aux. Angle A.

App. Alt.	Minutes of Moon's Hor. Parallax. 54′ Corr. +	A 60°	55′ Corr. +	A 60°	56′ Corr. +	A 60°	57′ Corr. +	A 60°	58′ Corr. +	A 60°	59′ Corr. +	A 60°	60′ Corr. +	A 60°	61′ Corr. +	A 60°	Seconds of H. P. ″	Corr. ″	A ″
86°	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	1	0	1
																	2	0	1
0′	3 42	29 55	3 46	30 30	3 50	31 4	3 55	31 39	3 59	32 13	4 3	32 47	4 7	33 22	4 11	33 56	3	0	2
2	3 40	29 56	3 44	30 30	3 48	31 4	3 53	31 39	3 57	32 13	4 1	32 48	4 5	33 22	4 9	33 56	4	0	2
4	3 38	29 56	3 42	30 30	3 47	31 4	3 51	31 39	3 55	32 13	3 59	32 48	4 3	33 22	4 7	33 56	5	0	3
6	3 36	29 56	3 40	30 30	3 45	31 4	3 49	31 39	3 53	32 13	3 57	32 48	4 1	33 22	4 5	33 56	6	0	3
8	3 35	29 56	3 39	30 30	3 43	31 4	3 47	31 39	3 51	32 13	3 55	32 48	3 59	33 22	4 3	33 56	7	0	4
10	3 33	29 56	3 37	30 30	3 41	31 5	3 45	31 39	3 49	32 13	3 53	32 48	3 57	33 22	4 1	33 56	8	0	5
																	9	1	5
12	3 31	29 56	3 35	30 30	3 39	31 5	3 43	31 39	3 47	32 13	3 51	32 48	3 55	33 22	3 59	33 57	10	1	6
14	3 29	29 56	3 33	30 30	3 37	31 5	3 41	31 39	3 45	32 13	3 49	32 48	3 53	33 22	3 57	33 57	11	1	6
16	3 27	29 56	3 31	30 30	3 35	31 5	3 39	31 39	3 43	32 13	3 47	32 48	3 51	33 22	3 54	33 57	12	1	7
																	13	1	7
18	3 25	29 56	3 29	30 30	3 33	31 5	3 37	31 39	3 41	32 14	3 45	32 48	3 49	33 22	3 52	33 57	14	1	8
20	3 23	29 56	3 27	30 30	3 31	31 5	3 35	31 39	3 39	32 14	3 43	32 48	3 46	33 22	3 50	33 57	15	1	9
22	3 22	29 56	3 25	30 30	3 29	31 5	3 33	31 39	3 37	32 14	3 41	32 48	3 44	33 22	3 48	33 57	16	1	9
																	17	1	10
24	3 20	29 56	3 24	30 30	3 27	31 5	3 31	31 39	3 35	32 14	3 39	32 48	3 42	33 22	3 46	33 57	18	1	10
26	3 18	29 56	3 22	30 31	3 25	31 5	3 29	31 39	3 33	32 14	3 37	32 48	3 40	33 23	3 44	33 57	19	1	11
28	3 16	29 56	3 20	30 31	3 24	31 5	3 27	31 39	3 31	32 14	3 35	32 48	3 38	33 23	3 42	33 57	20	1	11
																	21	1	12
30	3 14	29 56	3 18	30 31	3 22	31 5	3 25	31 39	3 29	32 14	3 32	32 48	3 36	33 23	3 40	33 57	22	1	13
32	3 12	29 56	3 16	30 31	3 20	31 5	3 23	31 39	3 27	32 14	3 30	32 48	3 34	33 23	3 38	33 57	23	1	13
34	3 11	29 56	3 14	30 31	3 18	31 5	3 21	31 40	3 25	32 14	3 28	32 48	3 32	33 23	3 36	33 57	24	1	14
																	25	1	14
36	3 9	29 56	3 12	30 31	3 16	31 5	3 19	31 40	3 23	32 14	3 26	32 48	3 30	33 23	3 34	33 57	26	2	15
38	3 7	29 56	3 10	30 31	3 14	31 5	3 17	31 40	3 21	32 14	3 24	32 48	3 28	33 23	3 31	33 57	27	2	16
40	3 5	29 56	3 8	30 31	3 12	31 5	3 15	31 40	3 19	32 14	3 22	32 48	3 26	33 23	3 29	33 57	28	2	16
																	29	2	17
42	3 3	29 57	3 7	30 31	3 10	31 5	3 14	31 40	3 17	32 14	3 20	32 49	3 24	33 23	3 27	33 57	30	2	17
44	3 1	29 57	3 5	30 31	3 8	31 5	3 12	31 40	3 15	32 14	3 18	32 49	3 22	33 23	3 25	33 57	31	2	18
46	2 59	29 57	3 3	30 31	3 6	31 5	3 10	31 40	3 13	32 14	3 16	32 49	3 20	33 23	3 23	33 57	32	2	18
																	33	2	19
48	2 58	29 57	3 1	30 31	3 4	31 5	3 8	31 40	3 11	32 14	3 14	32 49	3 18	33 23	3 21	33 58	34	2	20
50	2 56	29 57	2 59	30 31	3 2	31 6	3 6	31 40	3 9	32 14	3 12	32 49	3 16	33 23	3 19	33 58	35	2	20
52	2 54	29 57	2 57	30 31	3 0	31 6	3 4	31 40	3 7	32 14	3 10	32 49	3 14	33 23	3 17	33 58	36	2	21
																	37	2	21
54	2 52	29 57	2 55	30 31	2 59	31 6	3 2	31 40	3 5	32 14	3 8	32 49	3 11	33 23	3 15	33 58	38	2	22
56	2 50	29 57	2 53	30 31	2 57	31 6	3 0	31 40	3 3	32 14	3 6	32 49	3 9	33 23	3 13	33 58	39	2	22
58	2 48	29 57	2 51	30 31	2 55	31 6	2 58	31 40	3 1	32 15	3 4	32 49	3 7	33 23	3 11	33 58	40	2	23
87°	54′		55′		56′		57′		58′		59′		60′		61′		41	2	24
0′	2 46	29 57	2 50	30 31	2 53	31 6	2 56	31 40	2 59	32 15	3 2	32 49	3 5	33 23	3 8	33 58	42	2	24
2	2 45	29 57	2 48	30 31	2 51	31 6	2 54	31 40	2 57	32 15	3 0	32 49	3 3	33 24	3 6	33 58	43	2	25
4	2 43	29 57	2 46	30 32	2 49	31 6	2 52	31 40	2 55	32 15	2 58	32 49	3 1	33 24	3 4	33 58	44	3	25
6	2 41	29 57	2 44	30 32	2 47	31 6	2 50	31 40	2 53	32 15	2 56	32 49	2 59	33 24	3 2	33 58	45	3	26
8	2 39	29 57	2 42	30 32	2 45	31 6	2 48	31 41	2 51	32 15	2 54	32 49	2 57	33 24	3 0	33 58	46	3	26
10	2 37	29 57	2 40	30 32	2 43	31 6	2 46	31 41	2 49	32 15	2 52	32 49	2 55	33 24	2 58	33 58	47	3	27
																	48	3	28
12	2 35	29 57	2 38	30 32	2 41	31 6	2 44	31 41	2 47	32 15	2 50	32 50	2 53	33 24	2 56	33 58	49	3	28
14	2 34	29 57	2 36	30 32	2 39	31 6	2 42	31 41	2 45	32 15	2 48	32 50	2 51	33 24	2 54	33 59	50	3	29
16	2 32	29 58	2 35	30 32	2 37	31 6	2 40	31 41	2 43	32 15	2 46	32 50	2 49	33 24	2 52	33 59	51	3	29
																	52	3	30
18	2 30	29 58	2 33	30 32	2 36	31 7	2 38	31 41	2 41	32 15	2 44	32 50	2 47	33 24	2 50	33 59	53	3	30
20	2 28	29 58	2 31	30 32	2 34	31 7	2 36	31 41	2 39	32 15	2 42	32 50	2 45	33 24	2 48	33 59	54	3	31
22	2 26	29 58	2 29	30 32	2 32	31 7	2 34	31 41	2 37	32 16	2 40	32 50	2 43	33 24	2 46	33 59	55	3	32
																	56	3	32
24	2 24	29 58	2 27	30 32	2 30	31 7	2 32	31 41	2 35	32 16	2 38	32 50	2 41	33 24	2 43	33 59	57	3	33
26	2 22	29 58	2 25	30 32	2 28	31 7	2 31	31 41	2 33	32 16	2 36	32 50	2 39	33 25	2 41	33 59	58	3	33
28	2 21	29 58	2 23	30 32	2 26	31 7	2 29	31 41	2 31	32 16	2 34	32 50	2 37	33 25	2 39	33 59	59	3	34
																	=	=	=
30	2 19	29 58	2 21	30 32	2 24	31 7	2 27	31 41	2 29	32 16	2 32	32 50	2 35	33 25	2 37	33 59	Alt.	☉	☽
32	2 17	29 58	2 20	30 33	2 22	31 7	2 25	31 42	2 27	32 16	2 30	32 50	2 32	33 25	2 35	33 59		A	A
34	2 15	29 58	2 18	30 33	2 20	31 7	2 23	31 42	2 25	32 16	2 28	32 51	2 30	33 25	2 33	33 59	°	°	°
																	3	8	8
36	2 13	29 58	2 16	30 33	2 18	31 7	2 21	31 42	2 23	32 16	2 26	32 51	2 28	33 25	2 31	34 0	4	6	5
38	2 11	29 58	2 14	30 33	2 16	31 7	2 19	31 42	2 21	32 16	2 24	32 51	2 26	33 25	2 29	34 0	5	4	4
40	2 10	29 58	2 12	30 33	2 14	31 7	2 17	31 42	2 19	32 16	2 22	32 51	2 24	33 25	2 27	34 0	6	3	3
																	7	3	2
42	2 8	29 59	2 10	30 33	2 13	31 7	2 15	31 42	2 17	32 16	2 20	32 51	2 22	33 25	2 25	34 0	8	2	2
44	2 6	29 59	2 8	30 33	2 11	31 8	2 13	31 42	2 15	32 16	2 18	32 51	2 20	33 25	2 23	34 0	9	2	1
46	2 4	29 59	2 6	30 33	2 9	31 8	2 11	31 42	2 13	32 17	2 16	32 51	2 18	33 25	2 20	34 0	10	2	1
48	2 2	29 59	2 4	30 33	2 7	31 8	2 9	31 42	2 11	32 17	2 14	32 51	2 16	33 26	2 18	34 0	20	2	0
50	2 0	29 59	2 3	30 33	2 5	31 8	2 7	31 42	2 9	32 17	2 12	32 51	2 14	33 26	2 16	34 0	30	3	0
52	1 58	29 59	2 1	30 33	2 3	31 8	2 5	31 42	2 7	32 17	2 10	32 51	2 12	33 26	2 14	34 0	40	3	0
																	50	4	0
54	1 57	29 59	1 59	30 34	2 1	31 8	2 3	31 43	2 5	32 17	2 8	32 51	2 10	33 26	2 12	34 0	60	4	0
56	1 55	29 59	1 57	30 34	1 59	31 8	2 1	31 43	2 3	32 17	2 6	32 52	2 8	33 26	2 10	34 0	70	5	0
58	1 53	29 59	1 55	30 34	1 57	31 8	1 59	31 43	2 1	32 17	2 4	32 52	2 6	33 26	2 8	34 1	90	5	0

Correction of the Moon's Altitude, and the Aux. Angle A. (88° and 89°)

App. Alt.	Minutes of Moon's Hor. Parallax. 54′		55′		56′		57′		58′		59′		60′		61′	
88°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°	Corr. +	A 60°
	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	″	′ ″	′ ″	′ ″
0′	1 51	29 59	1 53	30 34	1 55	31 8	1 57	31 43	1 59	32 17	2 2	32 52	2 4	33 26	2 6	34 1
2	1 49	29 59	1 51	30 34	1 53	31 8	1 55	31 43	1 58	32 17	2 0	32 52	2 2	33 26	2 4	34 1
4	1 47	29 59	1 49	30 34	1 51	31 8	1 53	31 43	1 56	32 17	1 58	32 52	2 0	33 26	2 2	34 1
6	1 46	29 59	1 48	30 34	1 50	31 8	1 52	31 43	1 53	32 17	1 56	32 52	1 58	33 26	1 59	34 1
8	1 44	29 59	1 46	30 34	1 48	31 8	1 50	31 43	1 52	32 17	1 53	32 52	1 55	33 26	1 57	34 1
10	1 42	29 59	1 44	30 34	1 46	31 8	1 48	31 43	1 50	32 17	1 51	32 52	1 53	33 26	1 55	34 1
12	1 40	29 59	1 42	30 34	1 44	31 8	1 46	31 43	1 48	32 17	1 49	32 52	1 51	33 26	1 53	34 1
14	1 38	29 59	1 40	30 34	1 42	31 9	1 44	31 43	1 46	32 17	1 47	32 52	1 49	33 27	1 51	34 1
16	1 36	29 59	1 38	30 34	1 40	31 9	1 42	31 43	1 44	32 18	1 45	32 52	1 47	33 27	1 49	34 1
18	1 34	29 59	1 36	30 34	1 38	31 9	1 40	31 43	1 42	32 18	1 43	32 52	1 45	33 27	1 47	34 1
20	1 33	29 59	1 34	30 34	1 36	31 9	1 38	31 43	1 40	32 18	1 41	32 52	1 43	33 27	1 45	34 1
22	1 31	30 0	1 32	30 34	1 34	31 9	1 36	31 43	1 38	32 18	1 39	32 52	1 41	33 27	1 43	34 1
24	1 29	30 0	1 31	30 34	1 32	31 9	1 34	31 43	1 36	32 18	1 37	32 52	1 39	33 27	1 41	34 1
26	1 27	30 0	1 29	30 34	1 30	31 9	1 32	31 43	1 34	32 18	1 35	32 52	1 37	33 27	1 39	34 1
28	1 25	30 0	1 27	30 34	1 28	31 9	1 30	31 43	1 32	32 18	1 33	32 52	1 35	33 27	1 36	34 1
30	1 23	30 0	1 25	30 34	1 26	31 9	1 28	31 43	1 30	32 18	1 31	32 52	1 33	33 27	1 34	34 1
32	1 21	30 0	1 23	30 34	1 25	31 9	1 26	31 43	1 28	32 18	1 29	32 52	1 31	33 27	1 32	34 2
34	1 20	30 0	1 21	30 34	1 23	31 9	1 24	31 43	1 26	32 18	1 27	32 52	1 29	33 27	1 30	34 2
36	1 18	30 0	1 19	30 34	1 21	31 9	1 22	31 43	1 24	32 18	1 25	32 52	1 27	33 27	1 28	34 2
38	1 16	30 0	1 17	30 34	1 19	31 9	1 20	31 43	1 22	32 18	1 23	32 53	1 25	33 27	1 26	34 2
40	1 14	30 0	1 15	30 34	1 17	31 9	1 18	31 43	1 20	32 18	1 21	32 53	1 22	33 27	1 24	34 2
42	1 12	30 0	1 14	30 34	1 15	31 9	1 16	31 44	1 18	32 18	1 19	32 53	1 20	33 27	1 22	34 2
44	1 10	30 0	1 12	30 34	1 13	31 9	1 14	31 44	1 16	32 18	1 17	32 53	1 18	33 27	1 20	34 2
46	1 9	30 0	1 10	30 34	1 11	31 9	1 12	31 44	1 14	32 18	1 15	32 53	1 16	33 27	1 18	34 2
48	1 7	30 0	1 8	30 34	1 9	31 9	1 10	31 44	1 12	32 18	1 13	32 53	1 14	33 27	1 15	34 2
50	1 5	30 0	1 6	30 34	1 7	31 9	1 8	31 44	1 10	32 18	1 11	32 53	1 12	33 27	1 13	34 2
52	1 3	30 0	1 4	30 34	1 5	31 9	1 7	31 44	1 8	32 18	1 9	32 53	1 10	33 28	1 11	34 2
54	1 1	30 0	1 2	30 34	1 3	31 9	1 5	31 44	1 6	32 18	1 7	32 53	1 8	33 28	1 9	34 2
56	0 59	30 0	1 0	30 34	1 2	31 9	1 3	31 44	1 4	32 18	1 5	32 53	1 6	33 28	1 7	34 2
58	0 57	30 0	0 58	30 34	1 0	31 9	1 1	31 44	1 2	32 18	1 3	32 53	1 4	33 28	1 5	34 2
89°	54′		55′		56′		57′		58′		59′		60′		61′	
0′	0 56	30 0	0 57	30 34	0 58	31 9	0 59	31 44	1 0	32 18	1 1	32 53	1 2	33 28	1 3	34 2
2	0 54	30 0	0 55	30 34	0 56	31 9	0 57	31 44	0 58	32 18	0 59	32 53	1 0	33 28	1 1	34 2
4	0 52	30 0	0 53	30 34	0 54	31 9	0 55	31 44	0 56	32 18	0 57	32 53	0 58	33 28	0 59	34 2
6	0 50	30 0	0 51	30 34	0 52	31 9	0 53	31 44	0 54	32 19	0 55	32 53	0 56	33 28	0 57	34 2
8	0 48	30 0	0 49	30 34	0 50	31 9	0 51	31 44	0 52	32 19	0 53	32 53	0 54	33 28	0 54	34 2
10	0 47	30 0	0 47	30 34	0 48	31 9	0 49	31 44	0 50	32 19	0 51	32 53	0 52	33 28	0 52	34 3
12	0 45	30 0	0 46	30 34	0 46	31 9	0 47	31 44	0 48	32 19	0 49	32 53	0 50	33 28	0 50	34 3
14	0 43	30 0	0 44	30 35	0 45	31 9	0 45	31 44	0 46	32 19	0 47	32 53	0 47	33 28	0 48	34 3
16	0 41	30 0	0 42	30 35	0 43	31 9	0 43	31 44	0 44	32 19	0 45	32 53	0 45	33 28	0 46	34 3
18	0 39	30 0	0 40	30 35	0 41	31 9	0 41	31 44	0 42	32 19	0 43	32 53	0 43	33 28	0 44	34 3
20	0 38	30 0	0 38	30 35	0 39	31 9	0 39	31 44	0 40	32 19	0 41	32 53	0 41	33 28	0 42	34 3
22	0 36	30 0	0 36	30 35	0 37	31 9	0 38	31 44	0 38	32 19	0 39	32 54	0 39	33 28	0 40	34 3
24	0 34	30 0	0 35	30 35	0 35	31 9	0 36	31 44	0 36	32 19	0 37	32 54	0 37	33 28	0 38	34 3
26	0 32	30 0	0 33	30 35	0 33	31 9	0 34	31 44	0 34	32 19	0 35	32 54	0 35	33 28	0 36	34 3
28	0 31	30 0	0 31	30 35	0 31	31 10	0 32	31 44	0 32	32 19	0 33	32 54	0 33	33 28	0 34	34 3
30	0 29	30 0	0 29	30 35	0 30	31 10	0 30	31 44	0 30	32 19	0 31	32 54	0 31	33 28	0 31	34 3
32	0 27	30 0	0 27	30 35	0 28	31 10	0 28	31 44	0 28	32 19	0 29	32 54	0 29	33 28	0 29	34 3
34	0 25	30 0	0 26	30 35	0 26	31 10	0 26	31 44	0 26	32 19	0 27	32 54	0 27	33 29	0 27	34 3
36	0 23	30 0	0 24	30 35	0 24	31 10	0 24	31 44	0 24	32 19	0 25	32 54	0 25	33 29	0 25	34 3
38	0 22	30 0	0 22	30 35	0 22	31 10	0 22	31 44	0 22	32 19	0 23	32 54	0 23	33 29	0 23	34 3
40	0 20	30 0	0 20	30 35	0 20	31 10	0 20	31 44	0 20	32 19	0 21	32 54	0 21	33 29	0 21	34 3
42	0 18	30 0	0 18	30 35	0 18	31 10	0 18	31 44	0 19	32 19	0 19	32 54	0 19	33 29	0 19	34 3
44	0 16	30 0	0 16	30 35	0 16	31 10	0 17	31 44	0 17	32 19	0 17	32 54	0 17	33 29	0 17	34 3
46	0 15	30 0	0 15	30 35	0 15	31 10	0 15	31 45	0 15	32 19	0 15	32 54	0 15	33 29	0 15	34 4
48	0 13	30 0	0 13	30 35	0 13	31 10	0 13	31 45	0 13	32 19	0 13	32 54	0 13	33 29	0 13	34 4
50	0 11	30 0	0 11	30 35	0 11	31 10	0 11	31 45	0 11	32 19	0 11	32 54	0 11	33 29	0 10	34 4
52	0 9	30 0	0 9	30 35	0 9	31 10	0 9	31 45	0 9	32 19	0 9	32 54	0 8	33 29	0 8	34 4
54	0 7	30 0	0 7	30 35	0 7	31 10	0 7	31 45	0 7	32 19	0 7	32 54	0 6	33 29	0 6	34 4
56	0 6	30 0	0 5	30 35	0 5	31 10	0 5	31 45	0 5	32 20	0 5	32 54	0 4	33 29	0 4	34 4
58	0 4	30 0	0 4	30 35	0 3	31 10	0 3	31 45	0 3	32 20	0 3	32 54	0 2	33 29	0 2	34 4

Seconds of H. P.		
″	Corr.	A
—	″	°
1	0	1
2	0	1
3	0	2
4	0	2
5	0	3
6	0	3
7	0	4
8	0	5
9	0	5
10	0	6
11	0	6
12	0	7
13	0	7
14	0	8
15	0	9
16	0	9
17	0	10
18	0	10
19	0	11
20	0	11
21	0	12
22	0	13
23	0	13
24	0	14
25	0	14
26	0	15
27	0	16
28	0	16
29	0	17
30	1	17
31	1	18
32	1	18
33	1	19
34	1	20
35	1	20
36	1	21
37	1	21
38	1	22
39	1	22
40	1	23
41	1	24
42	1	24
43	1	25
44	1	25
45	1	26
46	1	26
47	1	27
48	1	28
49	1	28
50	1	29
51	1	29
52	1	30
53	1	30
54	1	31
55	1	32
56	1	32
57	1	33
58	1	33
59	1	34
App. Alt.	☽	☉	*
°	′	′	′
0	8	8	8
1	6	6	5
2	4	4	4
3	3	3	3
4	2	2	2
5	2	2	1
6	1	1	1
7	1	1	0
8	1	1	0
9	1	1	0
10	1	1	0
20	0	0	0
30	0	0	0
40	0	0	0
50	0	0	0
60	0	0	0
70	0	0	0
90	0	0	0

For correcting Longitude by Chronometer for an error in Latitude, and

Bearing.	Latitude.														
	0°	4°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°
10	5·67	5·70	5·73	5·76	5·79	5·85	5·91	5·97	6·03	6·12	6·21	6·30	6·42	6·55	6·69
11	5·14	5·16	5·19	5·22	5·26	5·30	5·35	5·41	5·47	5·55	5·63	5·72	5·83	5·94	6·07
12	4·70	4·72	4·75	4·78	4·81	4·85	4·89	4·95	5·01	5·08	5·16	5·28	5·34	5·43	5·55
13	4·33	4·34	4·37	4·40	4·43	4·46	4·51	4·55	4·61	4·67	4·74	4·82	4·91	5·00	5·11
14	4·01	4·02	4·04	4·06	4·09	4·12	4·16	4·20	4·26	4·32	4·38	4·46	4·54	4·63	4·73
15	3·73	3·74	3·77	3·79	3·81	3·85	3·88	3·92	3·97	4·02	4·08	4·15	4·23	4·31	4·40
16	3·49	3·50	3·52	3·54	3·56	3·59	3·62	3·66	3·70	3·76	3·82	3·88	3·94	4·02	4·11
17	3·27	3·28	3·30	3·32	3·34	3·37	3·40	3·44	3·48	3·53	3·58	3·64	3·70	3·78	3·86
18	3·08	3·09	3·11	3·13	3·15	3·18	3·20	3·24	3·28	3·32	3·37	3·43	3·49	3·55	3·63
19	2·90	2·91	2·93	2·95	2·97	2·99	3·02	3·05	3·09	3·13	3·18	3·23	3·29	3·35	3·42
20	2·75	2·76	2·78	2·79	2·81	2·83	2·86	2·89	2·92	2·96	3·01	3·06	3·12	3·17	3·24
21	2·60	2·61	2·63	2·65	2·66	2·68	2·71	2·74	2·77	2·81	2·85	2·90	2·95	3·01	3·07
22	2·47	2·47	2·48	2·50	2·52	2·54	2·57	2·60	2·63	2·66	2·70	2·75	2·80	2·86	2·92
23	2·36	2·36	2·38	2·39	2·41	2·43	2·45	2·48	2·51	2·54	2·58	2·62	2·67	2·72	2·78
24	2·25	2·26	2·27	2·28	2·30	2·32	2·34	2·37	2·39	2·43	2·46	2·50	2·55	2·59	2·65
26	2·05	2·05	2·07	2·08	2·10	2·11	2·13	2·15	2·18	2·21	2·24	2·28	2·32	2·37	2·42
28	1·88	1·88	1·90	1·91	1·92	1·94	1·96	1·98	2·00	2·03	2·06	2·09	2·13	2·17	2·22
30	1·73	1·73	1·75	1·76	1·77	1·78	1·80	1·82	1·84	1·87	1·89	1·92	1·96	2·00	2·04
32	1·60	1·60	1·62	1·63	1·64	1·65	1·66	1·68	1·70	1·73	1·75	1·78	1·81	1·85	1·89
34	1·48	1·48	1·49	1·50	1·51	1·53	1·54	1·56	1 57	1·60	1·62	1·65	1·68	1·71	1·75
36	1·38	1·38	1·39	1·40	1·41	1·42	1·44	1·45	1·47	1·49	1·51	1·53	1·55	1·59	1·62
38	1·28	1·28	1·28	1·29	1·30	1·31	1·32	1·34	1·35	1·37	1·39	1·41	1·44	1·48	1·51
40	1·19	1·19	1·20	1·21	1·22	1·23	1·24	1·25	1·27	1·28	1·30	1·32	1·35	1·38	1·41
42	1·11	1·11	1·12	1·13	1·14	1·14	1·15	1·17	1·18	1·20	1·22	1·24	1·26	1·28	1·31
44	1·04	1·04	1·04	1·05	1·06	1·07	1·08	1·09	1·10	1·12	1·13	1·15	1·17	1·20	1·22
46	0·97	0·97	0·98	0·98	0·99	1·00	1·01	1·02	1·03	1·04	1·06	1·07	1·09	1·11	1·14
48	0·90	0·90	0·91	0·91	0·92	0·93	0·94	0·95	0·96	0·97	0·99	1·00	1·02	1·04	1·06
50	0·84	0·84	0·85	0·85	0·86	0·87	0·87	0·88	0·89	0·91	0·92	0·93	0·95	0·97	0·99
52	0·78	0·78	0·79	0·79	0·80	0·80	0·81	0·82	0·83	0·84	0·85	0·87	0·88	0·90	0·92
54	0·73	0·73	0·73	0·74	0·74	0·75	0·75	0·76	0·77	0·78	0·79	0·81	0·82	0·84	0·86
56	0·67	0·67	0·68	0·68	0·69	0·69	0·70	0·71	0·71	0·72	0·73	0·75	0·77	0·78	0·79
58	0·63	0·63	0·63	0·63	0·64	0·64	0·65	0·66	0·66	0·67	0·68	0·69	0·71	0·72	0·74
60	0·58	0·58	0·59	0·59	0·59	0·60	0·60	0·61	0·62	0·62	0·63	0·65	0·66	0·67	0·68
62	0·53	0·53	0·54	0·54	0·54	0·55	0·55	0·56	0·56	0·57	0·58	0·59	0·60	0·61	0·63
64	0·49	0·49	0·50	0·50	0·50	0·51	0·51	0·52	0·52	0·53	0·54	0·55	0·56	0·56	0·57
66	0·45	0·45	0·45	0·45	0·46	0·46	0·46	0·47	0·47	0·48	0·49	0·50	0·50	0·51	0·52
68	0·40	0·40	0·40	0·41	0·41	0·41	0·42	0·42	0·43	0·43	0·44	0·45	0·45	0·47	0·47
70	0·36	0·36	0·36	0·37	0·37	0·37	0·37	0·38	0·38	0·39	0·39	0·40	0·41	0·42	0·43
72	0·33	0·33	0·33	0·33	0·34	0·34	0·34	0·34	0·35	0·35	0·36	0·36	0·37	0·37	0·38
74	0·29	0·29	0·29	0·29	0·30	0·30	0·30	0·31	0·31	0·31	0·32	0·32	0·33	0·33	0·34
76	0·25	0·25	0·25	0·25	0·25	0·26	0·27	0·27	0·27	0·27	0·27	0·28	0·28	0·29	0·29
78	0·21	0·21	0·21	0·21	0·21	0·22	0·22	0·22	0·22	0·23	0·23	0·23	0·23	0·24	0·25
80	0·18	0·18	0·18	0·18	0·18	0·18	0·18	0·18	0·19	0·19	0·19	0·20	0·20	0·20	0·21
82	0·14	0·14	0·14	0·14	0·14	0·14	0·14	0·15	0·15	0·15	0·15	0·15	0·15	0·16	0·17
84	0·10	0·10	0·10	0·10	0·10	0·10	0·11	0·11	0·11	0·11	0·11	0·11	0·11	0·12	0·12
86	0·07	0·07	0·07	0·07	0·07	0·07	0·07	0·07	0·07	0·08	0·08	0·08	0·08	0·08	0·08
88	0·03	0·03	0·03	0·04	0·04	0·04	0·04	0·04	0·04	0·04	0·04	0·04	0·04	0·04	0·04
89	0·01	0·01	0·01	0·02	0·02	0·02	0·02	0·02	0·02	0·02	0·02	0·02	0·02	0·02	0·02
90	0·00	0·00	0·00	0·00	0·00	0·00	0·00	0·00	0·00	0·00	0·00	0·00	0·00	0·00	0·00

For finding Latitude and Longitude by Double Chronometer Rule.

Bearing.	Latitude.														
	32°	34°	36°	38°	40°	42°	44°	46°	48°	50°	52°	54°	56°	58°	60°
10°	6·69	6·84	7·01	7·20	7·40	7·63	7·88	8·16	8·48	8·82	9·21	9·65	10·14	10·70	11·33
11	6·07	6·20	6·36	6·53	6·72	6·92	7·15	7·41	7·69	8·00	8·36	8·75	9·20	9·71	10·29
12	5·55	5·67	5·81	5·97	6·14	6·33	6·54	6·77	7·03	7·32	7·64	8·00	8·41	8·88	9·41
13	5·11	5·22	5·35	5·50	5·65	5·83	6·02	6·23	6·47	6·74	7·03	7·37	7·75	8·17	8·66
14	4·73	4·84	4·95	5·09	5·23	5·40	5·58	5·77	5·99	6·24	6·51	6·82	7·17	7·57	8·02
15	4·40	4·50	4·61	4·74	4·87	5·02	5·19	5·37	5·58	5·81	6·06	6·35	6·67	7·04	7·46
16	4·11	4·21	4·31	4·43	4·55	4·69	4·85	5·02	5·21	5·42	5·66	5·93	6·24	6·58	6·97
17	3·86	3·94	4·04	4·15	4·27	4·40	4·55	4·71	4·89	5·09	5·31	5·56	5·85	6·17	6·54
18	3·63	3·71	3·80	3·90	4·02	4·14	4·28	4·43	4·60	4·79	5·00	5·24	5·50	5·81	6·15
19	3·42	3·50	3·59	3·68	3·79	3·91	4·04	4·18	4·34	4·52	4·72	4·94	5·19	5·48	5·81
20	3·24	3·31	3·39	3·49	3·59	3·70	3·82	3·95	4·11	4·27	4·46	4·67	4·91	5·19	5·49
21	3·07	3·14	3·22	3·31	3·40	3·50	3·62	3·75	3·89	4·05	4·23	4·43	4·66	4·92	5·21
22	2·92	2·98	3·06	3·14	3·23	3·33	3·44	3·56	3·70	3·85	4·02	4·21	4·43	4·67	4·95
23	2·78	2·84	2·91	2·99	3·07	3·17	3·27	3·39	3·52	3·66	3·83	4·01	4·21	4·45	4·71
24	2·65	2·71	2·77	2·85	2·93	3·02	3·12	3·23	3·36	3·49	3·65	3·82	4·02	4·24	4·49
26	2·42	2·47	2·53	2·60	2·68	2·76	2·85	2·95	3·06	3·19	3·33	3·49	3·66	3·87	4·10
28	2·22	2·27	2·32	2·39	2·45	2·53	2·61	2·71	2·81	2·92	3·05	3·20	3·36	3·55	3·76
30	2·04	2·09	2·14	2·20	2·26	2·33	2·41	2·49	2·60	2·69	2·81	2·95	3·10	3·27	3·46
32	1·89	1·93	1·98	2·03	2·09	2·15	2·22	2·30	2·39	2·49	2·60	2·72	2·86	3·02	3·20
34	1·75	1·79	1·83	1·88	1·93	1·99	2·06	2·13	2·22	2·31	2·41	2·52	2·65	2·80	2·96
36	1·62	1·66	1·70	1·74	1·80	1·85	1·91	1·98	2·06	2·14	2·24	2·34	2·46	2·60	2·75
38	1·51	1·54	1·58	1·62	1·67	1·72	1·78	1·84	1·91	1·99	2·08	2·18	2·29	2·41	2·56
40	1·41	1·44	1·47	1·51	1·55	1·60	1·66	1·72	1·78	1·85	1·94	2·03	2·13	2·25	2·38
42	1·31	1·34	1·37	1·41	1·45	1·49	1·54	1·60	1·66	1·73	1·80	1·89	1·99	2·09	2·22
44	1·22	1·25	1·28	1·31	1·35	1·39	1·44	1·49	1·55	1·61	1·68	1·76	1·85	1·95	2·07
46	1·14	1·16	1·19	1·23	1·26	1·30	1·34	1·39	1·44	1·50	1·56	1·64	1·73	1·82	1·93
48	1·06	1·09	1·11	1·14	1·17	1·21	1·25	1·30	1·35	1·40	1·46	1·53	1·61	1·70	1·80
50	0·99	1·01	1·04	1·06	1·09	1·13	1·16	1·21	1·25	1·31	1·36	1·43	1·50	1·58	1·68
52	0·92	0·94	0·96	0·99	1·01	1·05	1·09	1·12	1·17	1·22	1·27	1·33	1·40	1·47	1·56
54	0·86	0·88	0·90	0·92	0·95	0·98	1·01	1·04	1·09	1·13	1·18	1·23	1·30	1·37	1·45
56	0·79	0·81	0·83	0·85	0·88	0·91	0·94	0·97	1·01	1·05	1·10	1·15	1·21	1·27	1·35
58	0·74	0·75	0·77	0·79	0·81	0·84	0·87	0·90	0·93	0·97	1·01	1·06	1·12	1·18	1·25
60	0·68	0·70	0·71	0·73	0·75	0·78	0·80	0·83	0·86	0·90	0·94	0·98	1·03	1·09	1·15
62	0·63	0·64	0·66	0·67	0·69	0·72	0·74	0·76	0·79	0·83	0·86	0·90	0·95	1·00	1·06
64	0·57	0·59	0·60	0·62	0·64	0·66	0·68	0·70	0·73	0·76	0·79	0·83	0·87	0·92	0·97
66	0·52	0·54	0·55	0·56	0·58	0·60	0·62	0·64	0·66	0·69	0·72	0·76	0·79	0·84	0·89
68	0·47	0·49	0·50	0·51	0·53	0·54	0·56	0·58	0·60	0·63	0·65	0·69	0·72	0·76	0·81
70	0·43	0·44	0·45	0·46	0·47	0·49	0·51	0·52	0·54	0·57	0·59	0·62	0·65	0·68	0·73
72	0·38	0·39	0·40	0·41	0·42	0·44	0·45	0·47	0·49	0·51	0·53	0·55	0·58	0·61	0·65
74	0·34	0·34	0·36	0·36	0·37	0·38	0·40	0·41	0·43	0·44	0·46	0·49	0·52	0·54	0·57
76	0·29	0·30	0·31	0·31	0·32	0·33	0·34	0·36	0·37	0·39	0·40	0·42	0·45	0·47	0·50
78	0·25	0·25	0·26	0·27	0·28	0·29	0·29	0·30	0·32	0·33	0·34	0·36	0·38	0·40	0·42
80	0·21	0·21	0·22	0·22	0·23	0·24	0·24	0·25	0·26	0·27	0·29	0·30	0·31	0·33	0·35
82	0·17	0·17	0·17	0·18	0·18	0·19	0·19	0·20	0·21	0·22	0·23	0·24	0·25	0·26	0·28
84	0.12	0·13	0·13	0·13	0·14	0·14	0·14	0·15	0·16	0·16	0·17	0·18	0·19	0·20	0·21
86	0·08	0·08	0·08	0·09	0·09	0·09	0·10	0·10	0·10	0·11	0·11	0·12	0·12	0·13	0·14
88	0·04	0·04	0·04	0·04	0·04	0·05	0·05	0·05	0·05	0·05	0·06	0·06	0·06	0·07	0·07
89	0·02	0·02	0·02	0·02	0·02	0·02	0·02	0·02	0·03	0·03	0·03	0·03	0·04	0·05	0·05
90	0·00	0·00	0·00	0·00	0·00	0·00	0·00	0·00	0·00	0·00	0·00	0·00	0·00	0·00	0·00

Conversion of Arc into Time and *vice versâ*.

Deg.	Hrs. Min.	Deg.	Hrs. Min.	Deg.	Hrs. Min.	Deg.	Hrs. Min.	Deg.	Hrs. Min.	Deg.	Hrs. Min.
Min.	Min. Sec.	Min.	Min. Sec.	Min.	Min. Sec.	Min.	Min. Sec.	Min.	Min. Sec.	Min.	Min. Sec.
0	0 0	60	4 0	120	8 0	180	12 0	240	16 0	300	20 0
1	„ 4	1	„ 4	1	„ 4	1	„ 4	1	„ 4	1	„ 4
2	„ 8	2	„ 8	2	„ 8	2	„ 8	2	„ 8	2	„ 8
3	„ 12	3	„ 12	3	„ 12	3	„ 12	3	„ 12	3	„ 12
4	„ 16	4	„ 16	4	„ 16	4	„ 16	4	„ 16	4	„ 16
5	„ 20	5	„ 20	5	„ 20	5	„ 20	5	„ 20	5	„ 20
6	„ 24	6	„ 24	6	„ 24	6	„ 24	6	„ 24	6	„ 24
7	„ 28	7	„ 28	7	„ 28	7	„ 28	7	„ 28	7	„ 28
8	„ 32	8	„ 32	8	„ 32	8	„ 32	8	„ 32	8	„ 32
9	„ 36	9	„ 36	9	„ 36	9	„ 36	9	„ 36	9	„ 36
10	„ 40	70	„ 40	130	„ 40	190	„ 40	250	„ 40	310	„ 40
11	„ 44	1	„ 44	1	„ 44	1	„ 44	1	„ 44	1	„ 44
12	„ 48	2	„ 48	2	„ 48	2	„ 48	2	„ 48	2	„ 48
13	„ 52	3	„ 52	3	„ 52	3	„ 52	3	„ 52	3	„ 52
14	„ 56	4	„ 56	4	„ 56	4	„ 56	4	„ 56	4	„ 56
15	1 0	5	5 0	5	9 0	5	13 0	5	17 0	5	21 0
16	„ 4	6	„ 4	6	„ 4	6	„ 4	6	„ 4	6	„ 4
17	„ 8	7	„ 8	7	„ 8	7	„ 8	7	„ 8	7	„ 8
18	„ 12	8	„ 12	8	„ 12	8	„ 12	8	„ 12	8	„ 12
19	„ 16	9	„ 16	9	„ 16	9	„ 16	9	„ 16	9	„ 16
20	„ 20	80	„ 20	140	„ 20	200	„ 20	260	„ 20	320	„ 20
1	„ 24	1	„ 24	1	„ 24	1	„ 24	1	„ 24	1	„ 24
2	„ 28	2	„ 28	2	„ 28	2	„ 28	2	„ 28	2	„ 28
3	„ 32	3	„ 32	3	„ 32	3	„ 32	3	„ 32	3	„ 32
4	„ 36	4	„ 36	4	„ 36	4	„ 36	4	„ 36	4	„ 36
5	„ 40	5	„ 40	5	„ 40	5	„ 40	5	„ 40	5	„ 40
6	„ 44	6	„ 44	6	„ 44	6	„ 44	6	„ 44	6	„ 44
7	„ 48	7	„ 48	7	„ 48	7	„ 48	7	„ 48	7	„ 48
8	„ 52	8	„ 52	8	„ 52	8	„ 52	8	„ 52	8	„ 52
9	„ 56	9	„ 56	9	„ 56	9	„ 56	9	„ 56	9	„ 56
30	2 0	90	6 0	150	10 0	210	14 0	270	18 0	330	22 0
1	„ 4	1	„ 4	1	„ 4	1	„ 4	1	„ 4	1	„ 4
2	„ 8	2	„ 8	2	„ 8	2	„ 8	2	„ 8	2	„ 8
3	„ 12	3	„ 12	3	„ 12	3	„ 12	3	„ 12	3	„ 12
4	„ 16	4	„ 16	4	„ 16	4	„ 16	4	„ 16	4	„ 16
5	„ 20	5	„ 20	5	„ 20	5	„ 20	5	„ 20	5	„ 20
6	„ 24	6	„ 24	6	„ 24	6	„ 24	6	„ 24	6	„ 24
7	„ 28	7	„ 28	7	„ 28	7	„ 28	7	„ 28	7	„ 28
8	„ 32	8	„ 32	8	„ 32	8	„ 32	8	„ 32	8	„ 32
9	„ 36	9	„ 36	9	„ 36	9	„ 36	9	„ 36	9	„ 36
40	„ 40	100	„ 40	160	„ 40	220	„ 40	280	„ 40	340	„ 40
1	„ 44	1	„ 44	1	„ 44	1	„ 44	1	„ 44	1	„ 44
2	„ 48	2	„ 48	2	„ 48	2	„ 48	2	„ 48	2	„ 48
3	„ 52	3	„ 52	3	„ 52	3	„ 52	3	„ 52	3	„ 52
4	„ 56	4	„ 56	4	„ 56	4	„ 56	4	„ 56	4	„ 56
5	3 0	5	7 0	5	11 0	5	15 0	5	19 0	5	23 0
6	„ 4	6	„ 4	6	„ 4	6	„ 4	6	„ 4	6	„ 4
7	„ 8	7	„ 8	7	„ 8	7	„ 8	7	„ 8	7	„ 8
8	„ 12	8	„ 12	8	„ 12	8	„ 12	8	„ 12	8	„ 12
9	„ 16	9	„ 16	9	„ 16	9	„ 16	9	„ 16	9	„ 16
50	„ 20	110	„ 20	170	„ 20	230	„ 20	290	„ 20	350	„ 20
1	„ 24	1	„ 24	1	„ 24	1	„ 24	1	„ 24	1	„ 24
2	„ 28	2	„ 28	2	„ 28	2	„ 28	2	„ 28	2	„ 28
3	„ 32	3	„ 32	3	„ 32	3	„ 32	3	„ 32	3	„ 32
4	„ 36	4	„ 36	4	„ 36	4	„ 36	4	„ 36	4	„ 36
5	„ 40	5	„ 40	5	„ 40	5	„ 40	5	„ 40	5	„ 40
6	„ 44	6	„ 44	6	„ 44	6	„ 44	6	„ 44	6	„ 44
7	„ 48	7	„ 48	7	„ 48	7	„ 48	7	„ 48	7	„ 48
8	„ 52	8	„ 52	8	„ 52	8	„ 52	8	„ 52	8	„ 52
9	„ 56	9	„ 56	9	„ 56	9	„ 56	9	„ 56	9	„ 56

NOTE.—In converting seconds of arc into time, remember the fractions are sixtieths; thus the value in time of 33″ is $2\frac{1}{3}\frac{3}{0} = 2{\cdot}2$ and *vice versâ*.

Hour Angle of the Sun on the Prime Vertical.

Declination of the same Name as the Latitude.

Lat.	0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°
°	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.
0	6. 0	6. 0	6. 0	6. 0	6. 0	6. 0	6. 0	6. 0	6. 0	6. 0	6. 0	6. 0	6. 0
1	6. 0	4. 0	5. 2	5.22	5.31	5.37	5.41	5.44	5.46	5.48	5.49	5.50	5.51
2	6. 0	0. 0	4. 0	4.42	5. 2	5.14	5.22	5.28	5.32	5.35	5.38	5.40	5.42
3	6. 0	3.13	2.46	4. 0	4.32	4.51	5. 3	5.11	5.18	5.23	5.27	5.30	5.33
4	6. 0	4. 0	0. 0	3.13	4. 1	4.27	4.43	4.55	5. 4	5.10	5.16	5.20	5.24
5	6. 0	4.26	2.28	2.15	3.26	4. 1	4.23	4.38	4.49	4.58	5. 4	5.10	5.15
6	6. 0	4.42	3.13	0. 0	2.46	3.34	4. 1	4.20	4.34	4.45	4.53	5. 0	5. 5
7	6. 0	4.54	3.42	2. 5	1.56	3. 3	3.39	4. 2	4.19	4.31	4.41	4.49	4.56
8	6. 0	5. 2	4. 1	2.46	0. 0	2.29	3.14	3.43	4. 3	4.17	4.29	4.39	4.46
9	6. 0	5. 9	4.15	3.14	1.50	1.44	2.47	3.22	3.46	4. 3	4.17	4.28	4.37
10	6. 0	5.14	4.27	3.34	2.29	0. 0	2.16	3. 0	3.28	3.49	4. 4	4.16	4.27
11	6. 0	5.19	4.36	3.49	2.55	1.40	1.35	2.35	3. 9	3.33	3.51	4. 5	4.16
12	6. 0	5.22	4.43	4. 1	3.14	2.16	0. 0	2. 6	2.49	3.17	3.37	3.53	4. 6
13	6. 0	5.25	4.49	4.12	3.30	2.41	1.32	1.29	2.26	2.59	3.23	3.41	3.55
14	6. 0	5.28	4.55	4.20	3.43	3. 0	2. 6	0. 0	1.58	2.40	3. 7	3.28	3.44
15	6. 0	5.30	4.59	4.28	3.53	3.15	2.30	1.26	1.23	2.18	2.50	3.14	3.32
16	6. 0	5.32	5. 4	4.34	4. 3	3.28	2.49	1.58	0. 0	1.52	2.32	2.59	3.20
17	6. 0	5.34	5. 7	4.40	4.11	3.39	3. 4	2.21	1.21	1.19	2.11	2.43	3. 7
18	6. 0	5.35	5.10	4.45	4.17	3.49	3.17	2.40	1.52	0. 0	1.47	2.26	2.53
19	6. 0	5.37	5.13	4.49	4.24	3.57	3.28	2.54	2.14	1.17	1.16	2. 6	2.37
20	6. 0	5.38	5.15	4.53	4.29	4. 4	3.37	3. 7	2.32	1.47	0. 0	1.43	2.21
21	6. 0	5.39	5.18	4.56	4.34	4.11	3.46	3.18	2.47	2. 9	1.14	1.13	2. 2
22	6. 0	5.40	5.20	5. 0	4.39	4.16	3.53	3.28	2.59	2.26	1.43	0. 0	1.30
23	6. 0	5.41	5.22	5. 3	4.43	4.22	4. 0	3.36	3.10	2.40	2. 4	1.11	1.10
24	6. 0	5.42	5.24	5. 5	4.46	4.27	4. 6	3.44	3.20	2.53	2.21	1.39	0. 0
25	6. 0	5.43	5.26	5. 8	4.50	4.31	4.12	3.51	3.28	3. 3	2.35	2. 0	1. 9
26	6. 0	5.44	5.27	5.10	4.53	4.35	4.17	3.57	3.36	3.13	2.47	2.16	1.36
27	6. 0	5.44	5.28	5.12	4.56	4.39	4.21	4. 3	3.43	3.22	2.58	2.30	1.56
28	6. 0	5.45	5.30	5.14	4.59	4.43	4.26	4. 8	3.49	3.29	3. 7	2.42	2.13
29	6. 0	5.45	5.31	5.16	5. 1	4.46	4.30	4.13	3.55	3.36	3.16	2.53	2.26
30	6. 0	5.46	5.32	5.18	5. 4	4.49	4.34	4.18	4. 1	3.43	3.24	3. 2	2.38
31	6. 0	5.47	5.33	5.20	5. 6	4.52	4.37	4.22	4. 6	3.49	3.31	3.11	2.49
32	6. 0	5.47	5.34	5.21	5. 8	4.54	4.40	4.26	4.11	3.55	3.37	3.19	2.58
33	6. 0	5.48	5.35	5.23	5.10	4.57	4.44	4.30	4.15	4. 0	3.44	3.26	3. 7
34	6. 0	5.48	5.36	5.24	5.12	4.59	4.47	4.33	4.19	4. 5	3.49	3.33	3.15
35	6. 0	5.49	5.37	5.25	5.14	5. 2	4.49	4.37	4.23	4. 9	3.55	3.39	3.22
36	6. 0	5.49	5.38	5.27	5.15	5. 4	4.52	4.40	4.27	4.14	4. 0	3.45	3.29
37	6. 0	5.49	5.39	5.28	5.17	5. 6	4.54	4.43	4.31	4.18	4. 4	3.50	3.35
38	6. 0	5.50	5.39	5.29	5.19	5. 8	4.57	4.46	4.34	4.22	4. 9	3.55	3.41
39	6. 0	5.50	5.40	5.30	5.20	5.10	4.59	4.48	4.37	4.25	4.13	4. 0	3.47
40	6. 0	5.50	5.41	5.31	5.21	5.11	5. 1	4.51	4.40	4.29	4.17	4. 5	3.52
41	6. 0	5.51	5.42	5.32	5.23	5.13	5. 3	4.53	4.43	4.32	4.21	4. 9	3.57
42	6. 0	5.51	5.42	5.33	5.24	5.15	5. 5	4.56	4.46	4.35	4.25	4.13	4. 1
43	6. 0	5.51	5.43	5.34	5.25	5.16	5. 7	4.58	4.48	4.38	4.28	4.17	4. 6
44	6. 0	5.52	5.43	5.35	5.27	5.18	5. 9	5. 0	4.51	4.41	4.31	4.21	4.10
45	6. 0	5.52	5.44	5.36	5.28	5.19	5.11	5. 2	4.53	4.44	4.35	4.25	4.14
46	6. 0	5.52	5.45	5.37	5.29	5.21	5.13	5. 4	4.56	4.47	4.38	4.28	4.18
47	6. 0	5.53	5.45	5.38	5.30	5.22	5.14	5. 6	4.58	4.49	4.41	4.31	4.22
48	6. 0	5.53	5.46	5.38	5.31	5.23	5.16	5. 8	5. 0	4.52	4.43	4.35	4.25
49	6. 0	5.53	5.46	5.39	5.32	5.25	5.17	5.10	5. 2	4.54	4.46	4.38	4.29
50	6. 0	5.53	5.47	5.40	5.33	5.26	5.19	5.12	5. 4	4.57	4.49	4.41	4.32
52	6. 0	5.54	5.47	5.41	5.35	5.28	5.22	5.15	5. 8	5. 1	4.54	4.46	4.39
54	6. 0	5.54	5.48	5.42	5.37	5.31	5.24	5.18	5.12	5. 5	4.59	4.52	4.45
56	6. 0	5.55	5.49	5.44	5.38	5.33	5.27	5.21	5.15	5. 9	5. 3	4.57	4.50
58	6. 0	5.55	5.50	5.45	5.40	5.35	5.29	5.24	5.19	5.13	5. 7	5. 2	4.55
60	6 0	5.55	5.51	5.46	5.41	5.37	5.32	5.27	5.22	5.17	5.11	5. 6	5. 0
62	6 0	5.56	5.51	5.47	5.43	5.38	5.34	5.30	5.25	5.20	5.15	5.10	5. 5
64	6. 6	5.56	5.52	5.48	5.44	5.40	5.36	5.32	5.28	5.24	5.19	5.15	5.10
66	6 0	5.56	5.53	5.49	5.46	5.42	5.38	5.35	5.31	5.27	5.23	5.19	5.14
68	6. 0	5.57	5.54	5.50	5.47	5.44	5.40	5.37	5.33	5.30	5.26	5.22	5.19
70	6. 0	5.57	5.54	5.51	5.48	5.45	5.42	5.39	5.36	5.33	5.30	5.26	5.23

Hour Angle of Sun on the Prime Vertical.

Declination of the same Name as the Latitude.

Lat.	26°	28°	30°	32°	34°	36°	38°	40°	42°	44°	46°	48°	50°
°	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.	h. m.
26	0. 0												
27	1. 7												
28	1.34	0. 0											
29	1.53	1. 6											
30	2. 9	1.32	0. 0										
31	2.23	1.51	1. 4										
32	2.35	2. 7	1.30	0. 0									
33	2.45	2.20	1.49	1. 3									
34	2.55	2.32	2. 5	1.28	0. 0								
35	3. 3	2.42	2.18	1.47	1. 2								
36	3.11	2.52	2.30	2. 3	1.27	0. 0							
37	3.19	3. 0	2.40	2.16	1.46	1. 2							
38	3.25	3. 8	2.49	2.28	2. 1	1.26	0. 0						
39	3.32	3.16	2.58	2.38	2.14	1.45	1. 1						
40	3.38	3.23	3. 6	2.47	2.26	2. 0	1.26	0. 0					
41	3.43	3.29	3.14	2.56	2.36	2.13	1.44	1. 1					
42	3.49	3.35	3.20	3. 4	2.46	2.25	1.59	1.25	0. 0				
43	3.54	3.41	3.27	3.12	2.55	2.35	2.12	1.48	1. 0				
44	3.59	3.46	3.33	3.19	3. 3	2.45	2.24	1.59	1.25	0. 0			
45	4. 3	3.52	3.39	3.25	3.10	2.54	2.34	2.12	1.48	1. 0			
46	4. 8	3.56	3.44	3.32	3.17	3. 2	2.44	2.23	1.58	1.25	0. 0		
47	4.12	4. 1	3.50	3.37	3.24	3. 9	2.53	2.34	2.12	1.48	1. 0		
48	4.16	4. 6	3.55	3.43	3.30	3.17	3. 1	2.44	2.23	1.58	1.25	0. 0	
49	4.20	4.10	4. 0	3.48	3.36	3.23	3. 9	2.53	2.34	2.12	1.48	1. 0	
50	4.23	4.14	4. 4	3.54	3.42	3.30	3.16	3. 1	2.44	2.23	1.59	1.25	0. 0
52	4.30	4.22	4.13	4. 3	3.53	3.42	3.30	3.16	3. 1	2.44	2.24	1.59	1.26
54	4.37	4.29	4.21	4.12	4. 3	3.53	3.42	3.30	3.17	3. 2	2.45	2.25	2. 0
56	4.43	4.36	4.28	4.20	4.12	4. 3	3.53	3.42	3.30	3.17	3. 3	2.46	2.26
58	4.49	4.42	4.35	4.28	4.20	4.12	4. 3	3.54	3.43	3.32	3.19	3. 4	2.47
60	4.55	4.48	4.42	4.35	4.28	4.21	4.13	4. 4	3.55	3.44	3.33	3.20	3. 6
62	5. 0	4.54	4.48	4.42	4.36	4.29	4.22	4.14	4. 6	3.56	3.46	3.35	3.23
64	5. 5	5. 0	4.55	4.49	4.43	4.37	4.30	4.23	4.16	4. 8	3.59	3.49	3.38
66	5.10	5. 5	5. 0	4.55	4.50	4.45	4.39	4.32	4.25	4.18	4.10	4. 1	3.52
68	5.15	5.10	5. 6	5. 2	4.57	4.52	4.46	4.41	4.35	4.28	4.21	4.13	4. 5
70	5.19	5.15	5.11	5. 7	5. 3	4.59	4.54	4.49	4.43	4.38	4.31	4.22	4.17

TABLE 28.

Altitude when Sun is on the Prime Vertical.

Declination of the same Name as the Latitude.

Lat.	0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°
1°	0° 0′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
2	0 0	90 0											
3	0 0	41 49											
4	0 0	30 1	90 0										
5	0 0	23 36	53 10										
6	0 0	19 30	41 52	90 0									
7	0 0	16 38	34 55	59 4									
8	0 0	14 31	30 5	48 41	90 0								
9	0 0	12 53	26 29	41 56	62 50								
10	0 0	11 36	23 41	37 1	53 16	90 0							
11	0 0	10 32	21 27	33 13	46 50	65 31							
12	0 0	9 40	19 36	30 11	42 1	56 38	90 0						
13	0 0	8 56	18 4	27 41	38 13	50 32	67 33						
14	0 0	8 18	16 45	25 36	35 7	45 52	59 15	90 0					
15	0 0	7 45	15 38	23 49	32 32	42 8	53 27	69 11					
16	0 0	7 16	14 40	22 17	30 20	39 3	48 58	61 22	90 0				
17	0 0	6 51	13 48	20 57	28 26	36 26	45 20	55 50	70 31				
18	0 0	6 29	13 3	19 46	26 46	34 11	42 17	51 32	63 7	90 0			
19	0 0	6 9	12 22	18 44	25 18	32 14	39 41	48 0	57 51	71 39			
20	0 0	5 51	11 46	17 48	24 1	30 31	37 26	45 1	53 42	64 37	90 0		
21	0 0	5 35	11 13	16 57	22 51	28 59	35 28	42 28	50 17	59 34	72 38		
22	0 0	5 21	10 44	16 12	21 49	27 37	33 43	40 14	47 22	55 35	65 55	90 0	
23	0 0	5 7	10 17	15 31	20 52	26 23	32 9	38 15	44 52	52 16	61 5	73 29	
24	0 0	4 55	9 53	14 53	20 1	25 16	30 45	36 30	42 40	49 27	57 14	67 5	90 0
25	0 0	4 44	9 30	14 19	19 14	24 16	29 28	34 55	40 43	46 59	54 1	62 25	74 16
26	0 0	4 34	9 9	13 48	18 31	23 20	28 19	33 30	38 58	44 49	51 17	58 43	68 5
27	0 0	4 25	8 50	13 19	17 51	22 29	27 15	32 12	37 23	42 54	48 53	55 36	63 37
28	0 0	4 16	8 33	12 52	17 15	21 42	26 17	31 1	35 57	41 10	46 46	52 56	60 3

Altitude when Sun is on the Prime Vertical.

Declination of the same Name as the Latitude.

Lat.	0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°
°	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
29	0 0	4 8	8 16	12 27	16 41	20 59	25 24	29 56	34 39	39 36	44 52	50 36	57 2
30	0 0	4 0	8 1	12 4	16 10	20 19	24 34	28 56	33 27	38 10	43 10	48 31	54 26
31	0 0	3 53	7 47	11 43	15 41	19 42	23 49	28 1	32 21	36 52	41 37	46 40	52 10
32	0 0	3 47	7 34	11 23	15 14	19 8	23 6	27 10	31 21	35 40	40 12	44 59	50 9
33	0 0	3 40	7 22	11 4	14 48	18 36	22 26	26 22	30 24	34 34	38 54	43 27	48 18
34	0 0	3 35	7 10	10 46	14 25	18 5	21 50	25 38	29 32	33 33	37 42	42 4	46 39
35	0 0	3 29	6 59	10 30	14 3	17 37	21 15	24 57	28 43	32 36	36 36	40 47	45 11
36	0 0	3 24	6 49	10 16	13 42	17 11	20 43	24 18	27 58	31 43	35 35	39 36	43 46
37	0 0	3 19	6 39	10 0	13 22	16 46	20 13	23 42	27 16	30 54	34 38	38 30	42 31
38	0 0	3 15	6 31	9 47	13 4	16 23	19 44	23 8	26 36	30 8	33 45	37 29	41 20
39	0 0	3 11	6 22	9 34	12 47	16 1	19 18	22 36	25 59	29 25	32 55	36 32	40 16
40	0 0	3 7	6 14	9 22	12 30	15 40	18 52	22 7	25 24	28 44	32 9	35 39	39 15
41	0 0	3 3	6 6	9 10	12 15	15 21	18 29	21 38	24 51	28 6	31 25	34 49	38 18
42	0 0	2 59	5 59	8 59	12 0	15 2	18 6	21 12	24 20	27 30	30 44	34 3	37 25
43	0 0	2 56	5 52	8 49	11 47	14 45	17 45	20 47	23 50	26 57	30 6	33 19	36 36
44	0 0	2 53	5 46	8 39	11 33	14 29	17 25	20 23	23 23	26 25	29 30	32 38	35 49
45	0 0	2 50	5 40	8 30	11 21	14 13	17 6	20 0	22 57	25 55	28 56	31 59	35 6
46	0 0	2 47	5 34	8 21	11 9	13 58	16 48	19 39	22 32	25 26	28 23	31 25	34 25
47	0 0	2 44	5 28	8 13	10 58	13 44	16 31	19 19	22 8	25 0	27 53	30 49	33 47
48	0 0	2 42	5 23	8 5	10 48	13 31	16 15	19 0	21 46	24 34	27 24	30 16	33 12
49	0 0	2 39	5 18	7 58	10 38	13 18	15 59	18 42	21 25	24 10	26 57	29 46	32 35
50	0 0	2 37	5 13	7 51	10 28	13 6	15 45	18 25	21 5	23 47	26 31	29 17	32 4
52	0 0	2 32	5 5	7 37	10 10	12 44	15 18	17 53	20 28	23 5	25 43	28 23	31 7
54	0 0	2 28	4 57	7 25	9 54	12 24	14 54	17 24	19 55	22 27	25 1	27 35	30 10
56	0 0	2 25	4 50	7 15	9 40	12 5	14 31	16 58	19 25	21 53	24 22	26 52	29 22
58	0 0	2 22	4 43	7 5	9 27	11 49	14 11	16 35	18 58	21 22	23 47	26 13	28 39
60	0 0	2 19	4 37	6 56	9 15	11 34	13 53	16 13	18 34	20 54	23 16	25 38	28 0
62	0 0	2 16	4 31	6 47	9 3	11 19	13 37	15 54	18 12	20 29	22 48	25 6	27 26
64	0 0	2 14	4 27	6 41	8 54	11 8	13 23	15 37	17 52	20 7	22 22	24 38	26 54
66	0 0	2 11	4 23	6 34	8 46	10 57	13 9	15 21	17 34	19 46	21 59	24 13	26 26
68	0 0	2 9	4 19	6 28	8 38	10 48	12 57	15 7	17 18	19 28	21 39	23 50	26 1
70	0 0	2 8	4 15	6 23	8 31	10 39	12 47	14 55	17 3	19 12	21 21	23 30	25 39

Lat.	26°	28°	30°	32°	34°	36°	38°	40°	42°	44°	46°	48°	50°
°	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′	° ′
26	90 0												
27	74 56												
28	69 2	90 0											
29	64 43	75 33											
30	61 15	69 52	90 0										
31	58 20	65 43	76 7										
32	55 49	62 22	70 39	90 0									
33	53 36	59 32	66 38	76 39									
34	51 37	57 6	63 24	71 23	90 0								
35	49 51	54 56	60 40	67 30	77 8								
36	48 14	53 0	58 17	64 22	72 3	90 0							
37	46 45	51 16	56 11	61 42	68 18	77 36							
38	45 24	49 41	54 18	59 24	65 16	72 42	90 0						
39	44 9	48 15	52 37	57 24	62 42	69 4	78 2						
40	43 0	46 55	51 4	55 32	60 27	66 8	73 18	90 0					
41	41 56	45 42	49 39	53 53	58 28	63 38	69 47	78 28					
42	40 56	44 33	48 21	52 22	56 41	61 27	66 56	73 52	90 0				
43	40 0	43 30	47 9	50 59	55 5	59 32	64 31	70 29	78 51				
44	39 8	42 31	46 2	49 43	53 37	57 48	62 25	67 43	74 25	90 0			
45	38 19	41 36	45 0	48 32	52 16	56 14	60 32	65 22	71 8	79 14			
46	37 33	40 45	44 2	47 27	51 1	54 48	58 51	63 20	68 28	74 57	90 0		
47	36 50	39 56	43 8	46 26	49 52	53 29	57 20	61 31	66 12	71 46	79 36		
48	36 9	39 11	42 17	45 29	48 48	52 16	55 56	59 53	64 13	69 11	75 28	90 0	
49	35 31	38 23	41 29	44 36	47 49	51 9	54 40	58 24	62 27	66 59	72 23	79 57	
50	34 54	37 48	40 45	43 46	46 53	50 7	53 29	57 3	60 52	65 4	69 53	75 57	90 0
52	33 48	36 34	39 23	42 16	45 12	48 14	51 23	54 40	58 7	61 50	65 54	70 34	76 25
54	32 49	35 28	38 10	40 55	43 43	46 36	49 33	52 37	55 48	59 10	62 46	66 43	71 14
56	31 55	34 30	37 6	39 44	42 25	45 9	47 57	50 50	53 49	56 55	60 11	63 41	67 31
58	31 8	33 37	36 8	38 40	41 15	43 53	46 33	49 17	52 6	55 0	58 1	61 12	64 36
60	30 25	32 50	35 16	37 44	40 13	42 45	45 19	47 55	50 36	53 20	56 10	59 6	62 12
62	29 46	32 7	34 30	36 53	39 18	41 44	44 13	46 43	49 17	51 53	54 32	57 19	60 11
64	29 11	31 30	33 48	36 8	38 28	40 51	43 14	45 40	48 7	50 37	53 10	55 47	58 28
66	28 41	30 55	33 11	35 27	37 45	40 3	42 22	44 43	47 6	49 30	51 57	54 26	56 59
68	28 13	30 26	32 38	34 51	37 6	39 20	41 36	43 53	46 12	48 31	50 53	53 16	55 43
70	27 48	29 58	32 9	34 20	36 31	38 43	40 56	43 10	45 24	47 40	49 57	52 16	54 36

Equation of Time at Mean Noon at Greenwich for reducing Mean to Apparent Time.

For the Year 1885.

Day.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
	sub.	*sub.*	*sub.*		*add.*		*sub.*	*sub.*	*add.*	*add.*	*add.*	
1	4m 0s	13m53s	12m28s	*sub.* 3m50s	3m 4s	*add* 2m25s	3m34s	6m 2s	0m14s	10m27s	16m19s	*add* 10m40s
2	4 28	14 0	12 16	3 32	3 11	2 16	3 45	5 58	0 33	10 46	16 20	10 16
3	4 56	14 6	12 3	3 14	3 18	2 7	3 56	5 54	0 53	11 4	16 20	9 53
4	5 23	14 12	11 49	2 56	3 24	1 57	4 7	5 48	1 12	11 23	16 18	9 28
5	5 50	14 16	11 35	2 38	3 29	1 46	4 18	5 43	1 32	11 40	16 17	9 3
6	6 16	14 20	11 21	2 21	3 34	1 36	4 28	5 36	1 52	11 58	16 14	8 38
7	6 42	14 23	11 7	2 4	3 39	1 25	4 37	5 29	2 12	12 15	16 10	8 11
8	7 7	14 26	10 52	1 47	3 42	1 13	4 47	5 22	2 32	12 31	16 6	7 45
9	7 32	14 27	10 36	1 30	3 45	1 2	4 56	5 14	2 53	12 47	16 1	7 18
10	7 56	14 28	10 21	1 14	3 48	0 50	5 5	5 5	3 13	13 3	15 54	6 50
11	8 20	14 28	10 5	0 57	3 50	0 38	5 13	4 56	3 34	13 18	15 48	6 23
12	8 43	14 27	9 49	0 42	3 51	0 25	5 21	4 46	3 55	13 33	15 40	5 55
13	9 6	14 26	9 32	0 26	3 52	0 13	5 28	4 36	4 16	13 47	15 31	5 26
14	9 28	14 23	9 15	*sub.* 0 11	3 52	*add* 0 0	5 35	4 25	4 37	14 1	15 22	4 57
15	9 49	14 20	8 58	*add* 0 4	3 52	*sub.* 0 13	5 41	4 13	4 58	14 14	15 11	4 28
16	10 10	14 17	8 41	0 18	3 51	0 26	5 47	4 1	5 19	14 27	15 0	3 59
17	10 29	14 12	8 24	0 32	3 49	0 39	5 52	3 49	5 40	14 39	14 49	3 30
18	10 48	14 7	8 6	0 46	3 47	0 52	5 57	3 35	6 2	14 50	14 36	3 0
19	11 7	14 1	7 48	0 59	3 44	1 5	6 1	3 22	6 23	15 1	14 22	2 31
20	11 24	13 55	7 30	1 12	3 41	1 18	6 5	3 8	6 44	15 11	14 8	2 1
21	11 41	13 48	7 12	1 25	3 38	1 30	6 8	2 53	7 5	15 21	13 53	1 31
22	11 57	13 40	6 54	1 37	3 34	1 43	6 10	2 38	7 26	15 30	13 37	1 1
23	12 13	13 31	6 36	1 49	3 29	1 56	6 12	2 23	7 47	15 38	13 20	0 31
24	12 27	13 22	6 17	2 0	3 24	2 9	6 13	2 7	8 8	15 46	13 3	*add* 0 1
25	12 41	13 12	5 59	2 10	3 18	2 22	6 14	1 50	8 28	15 53	12 45	*sub.* 0 28
26	12 54	13 2	5 40	2 21	3 12	2 34	6 14	1 34	8 49	15 59	12 26	0 58
27	13 6	12 51	5 22	2 30	3 5	2 46	6 14	1 17	9 9	16 4	12 6	1 28
28	13 17	12 40	5 3	2 40	2 58	2 59	6 13	0 59	9 29	16 9	11 45	1 57
29	13 27		4 45	2 48	2 51	3 11	6 11	0 41	9 49	16 12	11 24	2 26
30	13 37		4 26	2 57	2 43	3 22	6 9	0 23	10 8	16 15	11 2	2 55
31	13 45		4 8		2 34		6 6	0 5		16 18		3 24

For the Year 1886.

	sub.	*sub.*	*sub.*		*add.*		*sub.*	*sub.*	*add.*	*add.*	*add.*	
1	3m53s	13m51s	12m30s	*sub.* 3m54s	3m 3s	*add* 2m27s	3m33s	6m 5s	0m 8s	10m91s	16m18s	*add* 10m44s
2	4 21	13 58	12 18	3 36	3 10	2 18	3 44	6 1	0 27	10 40	16 18	10 21
3	4 49	14 5	12 5	3 18	3 16	2 8	3 55	5 57	0 46	10 58	16 18	9 57
4	5 16	14 10	11 52	3 0	3 22	1 58	4 6	5 52	1 5	11 17	16 18	9 33
5	5 43	14 15	11 38	2 43	3 28	1 47	4 17	5 46	1 25	11 35	16 16	9 8
6	6 10	14 19	11 25	2 25	3 32	1 37	4 27	5 40	1 45	11 52	16 14	8 43
7	6 36	14 23	11 10	2 8	3 37	1 26	4 37	5 33	2 5	12 9	16 10	8 17
8	7 1	14 25	10 55	1 51	3 41	1 14	4 47	5 25	2 26	12 26	16 6	7 51
9	7 26	14 27	10 40	1 34	3 44	1 3	4 56	5 17	2 46	12 43	16 1	7 24
10	7 51	14 28	10 25	1 18	3 46	0 51	5 4	5 9	3 7	12 59	15 56	6 57
11	8 15	14 28	10 9	1 2	3 48	0 39	5 13	4 59	3 28	13 14	15 49	6 30
12	8 38	14 27	9 53	0 46	3 50	0 27	5 20	4 49	3 49	13 29	15 42	6 2
13	9 1	14 26	9 36	0 30	3 51	0 15	5 28	4 39	4 10	13 44	15 34	5 34
14	9 23	14 24	9 19	*sub.* 0 15	3 51	*add* 0 2	5 34	4 28	4 31	13 57	15 24	5 5
15	9 44	14 21	9 2	*add* 0 0	3 51	*sub.* 0 10	5 41	4 17	4 53	14 11	15 14	4 36
16	10 4	14 17	8 45	0 15	3 51	0 23	5 46	4 5	5 14	14 24	15 4	4 7
17	10 24	14 13	8 27	0 29	3 49	0 36	5 52	3 52	5 35	14 36	14 52	3 38
18	10 43	14 8	8 10	0 43	3 48	0 49	5 56	3 39	5 56	14 48	14 39	3 8
19	11 2	14 2	7 52	0 57	3 45	1 2	6 1	3 26	6 17	14 59	14 26	2 38
20	11 19	13 55	7 34	1 10	3 42	1 14	6 4	3 12	6 39	15 9	14 12	2 9
21	11 36	13 48	7 15	1 22	3 39	1 27	6 7	2 57	7 0	15 19	13 57	1 39
22	11 52	13 40	6 57	1 35	3 35	1 40	6 10	2 42	7 20	15 28	13 41	1 9
23	12 8	13 32	6 39	1 47	3 30	1 53	6 12	2 27	7 41	15 36	13 24	0 38
24	12 22	13 23	6 20	1 58	3 25	2 6	6 14	2 11	8 2	15 43	13 7	*add* 0 8
25	12 36	13 13	6 2	2 9	3 20	2 19	6 15	1 55	8 22	15 50	12 49	*sub.* 0 22
26	12 49	13 3	5 43	2 19	3 14	2 32	6 15	1 39	8 43	15 56	12 30	0 51
27	13 1	12 53	5 25	2 29	3 7	2 44	6 15	1 22	9 3	16 2	12 10	1 21
28	13 13	12 42	5 7	2 38	3 0	2 56	6 14	1 5	9 23	16 7	11 49	1 51
29	13 23		4 48	2 47	2 52	3 9	6 13	0 47	9 42	16 10	11 28	2 20
30	13 33		4 30	2 55	2 44	3 21	6 11	0 29	10 2	16 14	11 6	2 49
31	13 42		4 12		2 36		6 8	0 11		16 16		3 18

NOTE.—The Equation under each year will approximately serve for each succeeding 4th year for four or five such periods, the greatest error not amounting to more than 7 seconds in 20 years.

Equation of Time at Mean Noon at Greenwich for reducing Mean to Apparent Time.

For the Year 1887.

Day.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
	sub.	*sub.*	*sub.*		*add.*		*sub.*	*sub.*	*add.*	*add.*	*add.*	
1	3m47s	13m49	12m33s	*sub.* 3m59s	3m 0s	*add* 2m28s	3m30s	6m 6s	0m 4s	10m17s	16m18s	*add* 10m50s
2	4 15	13 57	12 21	3 41	3 7	2 19	3 42	6 2	0 23	10 36	16 20	10 28
3	4 43	14 3	12 9	3 23	3 14	2 10	3 53	5 58	0 42	10 55	16 20	10 4
4	5 10	14 9	11 56	3 5	3 20	2 0	4 4	5 53	1 2	11 14	16 19	9 40
5	5 37	14 14	11 42	2 47	3 26	1 50	4 14	5 47	1 21	11 32	16 18	9 16
6	6 4	14 18	11 28	2 29	3 31	1 39	4 25	5 41	1 41	11 49	16 16	8 50
7	6 30	14 22	11 14	2 12	3 36	1 29	4 34	5 34	2 2	12 7	16 13	8 25
8	6 55	14 24	10 59	1 55	3 40	1 17	4 44	5 26	2 22	12 24	16 9	7 58
9	7 20	14 26	10 44	1 38	3 43	1 6	4 53	5 18	2 43	12 40	16 4	7 32
10	7 45	14 27	10 28	1 21	3 46	0 54	5 2	5 10	3 3	12 56	15 58	7 5
11	8 8	14 27	10 12	1 5	3 49	0 43	5 10	5 1	3 24	13 12	15 52	6 37
12	8 32	14 27	9 56	0 49	3 50	0 30	5 18	4 51	3 45	13 27	15 45	6 9
13	8 54	14 25	9 40	0 33	3 51	0 18	5 25	4 41	4 6	13 41	15 36	5 41
14	9 16	14 23	9 23	0 18	3 52	*add* 0 6	5 32	4 30	4 27	13 55	15 27	5 12
15	9 38	14 21	9 6	*sub.* 0 3	3 52	*sub.* 0 7	5 39	4 19	4 48	14 8	15 17	4 43
16	9 59	14 17	8 48	*add* 0 12	3 51	0 20	5 45	4 7	5 9	14 21	15 6	4 14
17	10 19	14 13	8 31	0 26	3 50	0 33	5 50	3 55	5 30	14 33	14 55	3 44
18	10 38	14 8	8 13	0 40	3 48	0 46	5 56	3 42	5 51	14 45	14 42	3 14
19	10 57	14 3	7 56	0 54	3 46	0 59	6 0	3 29	6 12	14 56	14 29	2 45
20	11 15	13 57	7 38	1 7	3 43	1 12	6 4	3 15	6 33	15 6	14 15	2 15
21	11 32	13 50	7 20	1 19	3 39	1 25	6 7	3 1	6 54	15 16	14 0	1 45
22	11 49	13 42	7 2	1 31	3 35	1 38	6 10	2 46	7 15	15 25	13 45	1 15
23	12 4	13 34	6 43	1 43	3 31	1 51	6 13	2 31	7 36	15 34	13 28	0 45
24	12 19	13 26	6 25	1 54	3 26	2 4	6 14	2 16	7 57	15 42	13 11	*add* 0 15
25	12 33	13 16	6 7	2 5	3 21	2 17	6 15	2 0	8 17	15 49	12 53	*sub.* 0 15
26	12 47	13 6	5 49	2 16	3 14	2 30	6 16	1 43	8 38	15 55	12 34	0 45
27	12 59	12 56	5 30	2 25	3 7	2 42	6 16	1 26	8 58	16 1	12 15	1 14
28	13 11	12 45	5 12	2 35	3 0	2 55	6 15	1 9	9 18	16 6	11 55	1 44
29	13 22		4 53	2 44	2 53	3 7	6 14	0 51	9 38	16 10	11 34	2 13
30	13 32		4 35	2 52	2 45	3 19	6 12	0 33	9 58	16 14	11 13	2 42
31	13 41		4 17		2 37		6 9	0 15		16 17		3 11

For the Year 1888.

	sub.	*sub.*	*sub.*		*add.*		*sub.*	*sub.*	*add.*	*add.*	*add.*	
1	3m39s	13m48s	12m25s	*sub.* 3m46s	3m 5s	*add* 2m22s	3m38s	6m 2s	0m19s	10m33s	16m20s	*add* 10m34s
2	4 8	13 55	12 12	3 27	3 12	2 12	3 50	5 58	0 38	10 52	16 21	10 11
3	4 36	14 2	12 0	3 10	3 18	2 2	4 1	5 53	0 58	11 10	16 20	9 47
4	5 3	14 8	11 46	2 52	3 24	1 52	4 11	5 48	1 17	11 28	16 19	9 22
5	5 30	14 14	11 32	2 34	3 30	1 42	4 22	5 42	1 37	11 46	16 17	8 57
6	5 57	14 18	11 18	2 17	3 34	1 31	4 32	5 35	1 57	12 3	16 14	8 31
7	6 23	14 22	11 3	2 0	3 38	1 20	4 42	5 28	2 17	12 20	16 10	8 5
8	6 49	14 25	10 48	1 43	3 42	1 8	4 51	5 20	2 38	12 36	16 6	7 38
9	7 14	14 27	10 33	1 27	3 45	0 56	5 0	5 12	2 58	12 52	16 0	7 11
10	7 39	14 28	10 17	1 10	3 47	0 45	5 9	5 3	3 19	13 8	15 54	6 44
11	8 3	14 29	10 1	0 54	3 49	0 32	5 17	4 54	3 40	13 23	15 47	6 16
12	8 27	14 29	9 45	0 39	3 50	0 20	5 24	4 44	4 1	13 38	15 39	5 48
13	8 50	14 28	9 29	0 23	3 50	*add* 0 7	5 31	4 33	4 22	13 52	15 30	5 19
14	9 12	14 26	9 12	*sub.* 0 8	3 50	*sub.* 0 5	5 38	4 22	4 43	14 6	15 20	4 50
15	9 34	14 23	8 55	*add* 0 6	3 50	0 18	5 44	4 10	5 4	14 19	15 10	4 21
16	9 55	14 20	8 37	0 21	3 49	0 31	5 50	3 58	5 25	14 31	14 59	8 52
17	10 16	14 16	8 20	0 35	3 47	0 44	5 55	3 45	5 47	14 43	14 47	3 23
18	10 35	14 12	8 2	0 48	3 45	0 57	5 59	3 32	6 8	14 55	14 34	2 53
19	10 54	14 6	7 44	1 2	3 42	1 10	6 3	3 18	6 29	15 5	14 20	2 23
20	11 12	14 0	7 26	1 14	3 39	1 22	6 7	3 4	6 50	15 15	14 6	1 54
21	11 30	13 53	7 8	1 27	3 35	1 35	6 9	2 49	7 12	15 25	13 50	1 24
22	11 46	13 46	6 50	1 39	3 31	1 48	6 12	2 34	7 33	15 34	13 34	0 54
23	12 2	13 38	6 31	1 50	3 26	2 1	6 13	2 18	7 53	15 42	13 17	*add* 0 24
24	12 17	13 29	6 13	2 2	3 21	2 14	6 14	2 2	8 14	15 49	12 59	*sub.* 0 6
25	12 31	13 20	5 54	2 12	3 15	2 26	6 15	1 46	8 35	15 56	12 41	0 36
26	12 45	13 10	5 36	2 22	3 9	2 39	6 15	1 29	8 55	16 2	12 22	1 6
27	12 57	13 0	5 17	2 32	3 2	2 51	6 14	1 12	9 15	16 7	12 1	1 35
28	13 9	12 49	4 59	2 41	2 55	3 3	6 13	0 54	9 35	16 11	11 41	2 5
29	13 20	12 37	4 40	2 50	2 47	3 15	6 11	0 36	9 55	16 15	11 19	2 34
30	13 30		4 22	2 58	2 39	3 27	6 9	0 18	10 14	16 17	10 57	3 3
31	13 39		4 4		2 31		6 6	0 0		16 19		3 32

NOTE.—The Equation under each year will approximately serve for each succeeding 4th year for four or five such periods, the greatest error not amounting to more than 7 seconds in 20 years.

Acceleration.

For converting Mean Solar Time into Sidereal Time.

H. M. S.	For Hours.	For Minutes.	For Seconds.
	Min. Sec.	Sec.	Sec.
1	0 9·8565	0·1643	0·0027
2	0 19·713	0·329	0·006
3	0 29·569	0·493	0·008
4	0 39·426	0·658	0·011
5	0 49·282	0·822	0·014
6	0 59·139	0·986	0·017
7	1 8·995	1·150	0·019
8	1 18·852	1·315	0·022
9	1 28·708	1·479	0·025
10	1 38·565	1·643	0·027
11	1 48·421	1·807	0·030
12	1 58·278	1·972	0·033
13	2 8·134	2·136	0·036
14	2 17·991	2·300	0·038
15	2 27·847	2·464	0·041
16	2 37·704	2·629	0·044
17	2 47·560	2·793	0·047
18	2 57·417	2·957	0·050
19	3 7·273	3·121	0·053
20	3 17·130	3·286	0·055
21	3 26·987	3·450	0·058
22	3 36·844	3·614	0·061
23	3 46·700	3·779	0·064
24	3 56·556	3·943	0·066
25		4·108	0·069
26		4·272	0·072
27		4·436	0·075
28		4·600	0·077
29		4·764	0·080
30		4·928	0·082
31		5·092	0·085
32		5·257	0·088
33		5·421	0·091
34		5·585	0·094
35		5·750	0·097
36		5·914	0·100
37		6·078	0·103
38		6·242	0·106
39		6·407	0·108
40		6·571	0·111
41		6·735	0·114
42		6·900	0·116
43		7·064	0·119
44		7·228	0·122
45		7·393	0·125
46		7·557	0·128
47		7·722	0·131
48		7·886	0·133
49		8·050	0·136
50		8·214	0·138
51		8·378	0·141
52		8·543	0·144
53		8·707	0·147
54		8·872	0·150
55		9·036	0·152
56		9·200	0·155
57		9·364	0·157
58		9·528	0·159
59		9·692	0·162
60		9·857	0·164

Retardation.

For converting Sidereal Time into Mean Solar Time.

H. M. S.	For Hours.	For Minutes.	For Seconds.
	Min. Sec.	Sec.	Sec.
1	0 9·8296	0·1638	0·0027
2	0 19·659	0·328	0·006
3	0 29·489	0·491	0·009
4	0 39·318	0·655	0·011
5	0 49·148	0·819	0·014
6	0 58·978	0·983	0·016
7	1 8·807	1·145	0·019
8	1 18·637	1·311	0·022
9	1 28·466	1·474	0·025
10	1 38·296	1·638	0·027
11	1 48·125	1·802	0·030
12	1 57·955	1·966	0·033
13	2 7·784	2·123	0·036
14	2 17·614	2·294	0·038
15	2 27·443	2·457	0·041
16	2 37·273	2·621	0·044
17	2 47·103	2·784	0·046
18	2 56·932	2·949	0·049
19	3 6·762	3·113	0·052
20	3 16·591	3·277	0·055
21	3 26·421	3·440	0·057
22	3 36·250	3·604	0·060
23	3 46·080	3·768	0·063
24	3 55·909	3·932	0·066
25		4·096	0·068
26		4·260	0·071
27		4·423	0·074
28		4·587	0·076
29		4·751	0·079
30		4·915	0·082
31		5·079	0·085
32		5·242	0·087
33		5·406	0·090
34		5·570	0·093
35		5·734	0·096
36		5·898	0·098
37		6·067	0·101
38		6·225	0·104
39		6·389	0·107
40		6·552	0·109
41		6·717	0·112
42		6·881	0·115
43		7·045	0·117
44		7·208	0·120
45		7·372	0·123
46		7·536	0·126
47		7·670	0·128
48		7·864	0·131
49		8·028	0·134
50		8·191	0·137
51		8·355	0·139
52		8·519	0·142
53		8·683	0·145
54		8·847	0·147
55		9·010	0·150
56		9·174	0·153
57		9·338	0·156
58		9·502	0·158
59		9·666	0·161
60		9·830	0·164

LOG. SINE TO SECONDS.

′	0° 0′	0° 1′	0° 2′	0° 3′	0° 4′	0° 5′	0° 6′	0° 7′	0° 8′	0° 9′	′
0		6.463726	6.764756	6.940847	7.065786	7.162696	7.241877	7.308824	7.366816	7.417968	60
1	4.685575	6.470905	6.768360	6.943253	7.067592	7.164141	7.243082	7.309857	7.367719	7.418772	59
2	4.986605	6.477966	6.771935	6.945646	7.069390	7.165582	7.244283	7.310887	7.368621	7.419574	58
3	5.162696	6.484915	6.775480	6.948026	7.071181	7.167017	7.245481	7.311915	7.369522	7.420374	57
4	5.287635	6.491755	6.778996	6.950393	7.072965	7.168448	7.246676	7.312940	7.370420	7.421173	56
5	5.384545	6.498488	6.782485	6.952746	7.074741	7.169874	7.247867	7.313963	7.371316	7.421971	55
6	5.463726	6.505119	6.785945	6.955088	7.076510	7.171296	7.249056	7.314984	7.372211	7.422767	54
7	5.530673	6.511650	6.789379	6.957416	7.078272	7.172713	7.250241	7.316002	7.373103	7.423562	53
8	5.588665	6.518084	6.792785	6.959733	7.080026	7.174125	7.251422	7.317018	7.373994	7.424355	52
9	5.639817	6.524424	6.796164	6.962037	7.081774	7.175533	7.252601	7.318032	7.374883	7.425147	51
10	5.685575	6.530673	6.799518	6.964328	7.083515	7.176936	7.253776	7 319043	7.375770	7.425937	50
11	5.726968	6.536833	6.802846	6.966608	7.085248	7.178335	7.254948	7.320052	7.376656	7.426726	49
12	5.764756	6.542907	6.806149	6.968876	7.086975	7.179729	7.256118	7.321058	7.377540	7.427513	48
13	5.799518	6.548898	6.809426	6.971132	7.088695	7.181119	7.257283	7.322062	7.378421	7.428299	47
14	5.831703	6.554807	6.812680	6.973376	7.090408	7.182504	7.258446	7.323064	7.379301	7.429084	46
15	5.861666	6.560636	6.815909	6.975609	7.092115	7.183885	7.259606	7.324064	7.380180	7.429867	45
16	5.889695	6.566388	6.819114	6.977831	7.093815	7.185262	7.260762	7.325061	7.381056	7.430649	44
17	5.916024	6.572066	6.822295	6.980041	7.095508	7.186634	7.261916	7.326056	7.381931	7.431429	43
18	5.940847	6.577669	6.825454	6.982240	7.097194	7.188002	7.263066	7.327049	7.382804	7 432208	42
19	5.964328	6.583202	6.828590	6.984428	7.098874	7.189365	7.264214	7.328039	7.383675	7.432986	41
20	5.986605	6.588665	6.831703	6.986605	7.100548	7.190725	7.265358	7.329027	7.384544	7.433762	40
21	6.007794	6.594060	6.834794	6.988771	7.102215	7.192080	7.266500	7.330013	7.385412	7.434537	39
22	6.027997	6.599389	6.837863	6.990926	7.103876	7.193431	7.267638	7.330997	7.386278	7.435311	38
23	6.047303	6.604653	6.840911	6.993071	7.105530	7.194777	7.268773	7.331978	7.387142	7.436083	37
24	6.065786	6.609854	6.843937	6.995205	7.107179	7.196120	7.269906	7.332957	7.388005	7.436853	36
25	6.083515	6.614994	6.846943	6.997329	7.108821	7.197458	7.271035	7.333934	7.388866	7.437623	35
26	6.100548	6.620073	6.849928	6.999442	7.110456	7.198792	7.272162	7.334909	7.389725	7.438391	34
27	6.116939	6.625094	6.852892	7.001545	7.112086	7.200122	7.273286	7.335882	7.390582	7.439157	33
28	6.132733	6.630057	6.855836	7.003638	7.113709	7.201448	7.274406	7.336852	7.391438	7.439923	32
29	6.147973	6.634965	6.858761	7.005721	7.115327	7.202771	7.275524	7.337821	7.392292	7.440687	31
30	6.162696	6.639817	6.861666	7.007794	7.116938	7.204089	7.276639	7.338787	7.393145	7.441449	30
31	6.176937	6.644616	6.864552	7.009857	7.118544	7.205403	7.277751	7.339751	7.393995	7.442210	29
32	6.190725	6.649363	6.867418	7.011911	7.120144	7.206713	7.278861	7.340713	7.394844	7.442970	28
33	6.204089	6.654058	6.870266	7.013954	7.121737	7.208019	7.279967	7.341673	7.395692	7.443729	27
34	6.217054	6.658703	6.873095	7.015989	7.123325	7.209321	7.281071	7.342630	7.396537	7.444486	26
35	6.229643	6.663298	6.875906	7.018013	7.124907	7.210619	7.282172	7.343586	7.397382	7.445242	25
36	6.241877	6.667846	6.878699	7.020028	7.126484	7.211914	7.283270	7.344539	7.398224	7.445997	24
37	6.253777	6.672347	6.881474	7.022034	7.128054	7 213205	7.284365	7.345491	7.399065	7.446750	23
38	6.265358	6.676801	6.884232	7.024031	7.129619	7.214491	7.285458	7.346440	7.399904	7.447502	22
39	6.276639	6.681210	6.886972	7.026019	7.131179	7.215774	7.286547	7.347387	7.400742	7.448253	21
40	6.287635	6.685575	6.889695	7.027997	7.132733	7.217054	7.287635	7.348332	7.401578	7.449002	20
41	6.298359	6.689896	6.892401	7.029967	7.134281	7.218329	7.288719	7.349275	7.402412	7.449750	19
42	6.308824	6.694175	6.895090	7.031928	7.135824	7.219601	7.289801	7.350216	7.403245	7.450497	18
43	6.319043	6.698412	6.897762	7.033880	7.137361	7.220869	7.290880	7.351155	7.404076	7.451243	17
44	6.329027	6.702608	6.900419	7.035823	7.138893	7.222133	7.291956	7.352092	7.404906	7.451987	16
45	6.338787	6.706764	6.903059	7.037757	7.140420	7.223394	7.293030	7.353027	7.405734	7.452730	15
46	6.348333	6.710881	6.905683	7.039683	7.141941	7.224651	7.294101	7.353960	7.406560	7.453472	14
47	6.357673	6.714959	6.908291	7.041601	7.143457	7.225904	7.295169	7.354891	7.407385	7.454212	13
48	6.366816	6.718999	6.910884	7.043510	7.144967	7.227154	7.296235	7.355820	7.408208	7.454952	12
49	6.375771	6.723001	6.913461	7.045410	7.146473	7.228400	7.297298	7.356747	7.409030	7.455690	11
50	6.384545	6.726967	6.916024	7.047303	7.147973	7.229643	7.298358	7.357672	7.409850	7.456426	10
51	6.393145	6.730898	6.918571	7.049187	7.149468	7.230882	7.299416	7.358595	7.410669	7.457162	9
52	6.401578	6.734793	6.921103	7.051063	7.150958	7.232117	7.300472	7.359516	7.411486	7.457896	8
53	6.409851	6.738653	6.923621	7.052931	7.152442	7.233349	7.301525	7.360436	7.412302	7.458629	7
54	6.417969	6.742480	6.926124	7.054791	7.153922	7.234578	7.302575	7.361353	7.413116	7.459361	6
55	6.425938	6.746273	6.928613	7.056643	7.155397	7 235803	7.303623	7.362268	7.413928	7.460091	5
56	6.433763	6.750033	6.931087	7.058487	7.156866	7.237025	7.304668	7.363181	7.414739	7.460822	4
57	6.441450	6.753761	6.933548	7.060323	7.158331	7.238243	7.305711	7.364093	7.415549	7.461549	3
58	6.449003	6.757457	6.935995	7.062152	7.159791	7.239458	7.306751	7.365002	7.416357	7.462275	2
59	6.456427	6.761122	6.938428	7.063973	7.161246	7.240669	7.307789	7.365910	7.417163	7.463003	1
60	6.463726	6.764756	6.940847	7.065786	7.162696	7.241877	7.308824	7.366816	7.417968	7.463725	0
′	89° 59′	89° 58′	89° 57′	89° 56′	89° 55	89° 54′	89° 53′	89° 52′	89° 51′	89° 50′	′

LOG. COSINE TO SECONDS.

LOG. SINE TO SECONDS.

″	0° 10′	0° 11′	0° 12′	0° 13′	0° 14′	0° 15′	0° 16′	0° 17′	0° 18′	0° 19′	″
0	7.463725	7.505118	7.542906	7.577668	7.609853	7.639816	7.667844	7.694173	7.718997	7.742477	60
1	7.464449	7.505776	7.543509	7.578225	7.610370	7.640298	7.668297	7.694599	7.719399	7.742858	59
2	7.465171	7.506432	7.544111	7.578781	7.610886	7.640780	7.668748	7.695024	7.719800	7.743239	58
3	7.465892	7.507088	7.544712	7.579336	7.611401	7.641261	7.669200	7.695449	7.720201	7.743619	57
4	7.466611	7.507742	7.545312	7.579890	7.611916	7.641742	7.669650	7.695873	7.720602	7.743999	56
5	7.467330	7.508396	7.545912	7.580443	7.612430	7.642222	7.670101	7.696297	7.721003	7.744378	55
6	7.468047	7.509048	7.546511	7.580996	7.612944	7.642702	7.670550	7.696720	7.721403	7.744757	54
7	7.468763	7.509700	7.547108	7.581548	7.613457	7.643181	7.671000	7.697143	7.721802	7.745136	53
8	7.469478	7.510351	7.547705	7.582100	7.613969	7.643659	7.671449	7.697566	7.722202	7.745514	52
9	7.470191	7.511000	7.548301	7.582651	7.614481	7.644137	7.671897	7.697988	7.722601	7.745893	51
10	7.470904	7.511649	7.548897	7.583201	7.614993	7.644615	7.672345	7.698410	7.722999	7.746270	50
11	7.471615	7.512297	7.549491	7.583750	7.615503	7.645092	7.672792	7.698832	7.723398	7.746648	49
12	7.472326	7.512943	7.550085	7.584299	7.616013	7.645568	7.673239	7.699253	7.723795	7.747025	48
13	7.473035	7.513589	7.550678	7.584847	7.616523	7.646044	7.673686	7.699673	7.724193	7.747402	47
14	7.473743	7.514234	7.551270	7.585394	7.617031	7.646520	7.674132	7.700094	7.724590	7.747778	46
15	7.474449	7.514878	7.551861	7.585941	7.617540	7.646994	7.674578	7.700513	7.724987	7.748155	45
16	7.475155	7.515521	7.552452	7.586487	7.618047	7.647469	7.675023	7.700933	7.725383	7.748530	44
17	7.475859	7.516163	7.553041	7.587032	7.618554	7.647943	7.675468	7.701352	7.725779	7.748906	43
18	7.476563	7.516804	7.553630	7.587577	7.619061	7.648416	7.675912	7.701770	7.726175	7.749281	42
19	7.477265	7.517444	7.554218	7.588121	7.619567	7.648889	7.676356	7.702189	7.726570	7.749656	41
20	7.477966	7.518083	7.554806	7.588664	7.620072	7.649361	7.676799	7.702606	7.726965	7.750031	40
21	7.478666	7.518721	7.555392	7.589206	7.620577	7.649833	7.677242	7.703024	7.727360	7.750405	39
22	7.479365	7.519358	7.555978	7.589748	7.621081	7.650304	7.677685	7.703441	7.727754	7.750779	38
23	7.480062	7.519995	7.556563	7.590289	7.621584	7.650775	7.678127	7.703857	7.728148	7.751152	37
24	7.480759	7.520630	7.557147	7.590830	7.622087	7.651245	7.678568	7.704273	7.728542	7.751525	36
25	7.481454	7.521265	7.557730	7.591370	7.622590	7.651715	7.679009	7.704689	7.728935	7.751898	35
26	7.482148	7.521898	7.558313	7.591909	7.623091	7.652184	7.679450	7.705105	7.729328	7.752271	34
27	7.482842	7.522531	7.558894	7.592447	7.623593	7.652653	7.679890	7.705520	7.729720	7.752643	33
28	7.483534	7.523162	7.559475	7.592985	7.624093	7.653121	7.680330	7.705934	7.730112	7.753015	32
29	7.484225	7.523793	7.560056	7.593522	7.624593	7.653589	7.680769	7.706348	7.730504	7.753387	31
30	7.484915	7.524423	7.560635	7.594059	7.625093	7.654056	7.681208	7.706762	7.730896	7.753758	30
31	7.485603	7.525052	7.561214	7.594595	7.625592	7.654523	7.681647	7.707176	7.731287	7.754129	29
32	7.486291	7.525680	7.561792	7.595130	7.626090	7.654989	7.682085	7.707589	7.731678	7.754500	28
33	7.486978	7.526307	7.562369	7.595664	7.626588	7.655455	7.682522	7.708001	7.732068	7.754870	27
34	7.487663	7.526933	7.562945	7.596198	7.627085	7.655920	7.682960	7.708414	7.732458	7.755241	26
35	7.488348	7.527559	7.563521	7.596731	7.627582	7.656385	7.683396	7.708825	7.732848	7.755610	25
36	7.489031	7.528183	7.564096	7.597264	7.628078	7.656849	7.683832	7.709237	7.733237	7.755980	24
37	7.489714	7.528807	7.564670	7.597796	7.628573	7.657313	7.684268	7.709648	7.733626	7.756349	23
38	7.490395	7.529429	7.565243	7.598327	7.629068	7.657776	7.684704	7.710059	7.734014	7.756718	22
39	7.491075	7.530051	7.565816	7.598858	7.629562	7.658239	7.685139	7.710469	7.734403	7.757086	21
40	7.491754	7.530672	7.566387	7.599388	7.630056	7.658701	7.685573	7.710879	7.734791	7.757454	20
41	7.492432	7.531292	7.566958	7.599917	7.630549	7.659163	7.686007	7.711288	7.735178	7.757822	19
42	7.493109	7.531911	7.567529	7.600445	7.631042	7.659624	7.686441	7.711697	7.735566	7.758190	18
43	7.493785	7.532529	7.568098	7.600973	7.631534	7.660085	7.686874	7.712106	7.735952	7.758557	17
44	7.494460	7.533147	7.568667	7.601501	7.632026	7.660545	7.687307	7.712515	7.736339	7.758924	16
45	7.495134	7.533763	7.569235	7.602028	7.632517	7.661005	7.687739	7.712922	7.736725	7.759291	15
46	7.495807	7.534379	7.569803	7.602554	7.633007	7.661464	7.688171	7.713330	7.737111	7.759657	14
47	7.496478	7.534993	7.570369	7.603079	7.633497	7.661923	7.688603	7.713737	7.737497	7.760023	13
48	7.497149	7.535607	7.570935	7.603604	7.633986	7.662382	7.689034	7.714144	7.737882	7.760389	12
49	7.497819	7.536220	7.571500	7.604128	7.634475	7.662839	7.689464	7.714551	7.738267	7.760754	11
50	7.498487	7.536832	7.572065	7.604652	7.634963	7.663297	7.689894	7.714957	7.738651	7.761119	10
51	7.499155	7.537444	7.572628	7.605175	7.635451	7.663754	7.690324	7.715362	7.739035	7.761484	9
52	7.499822	7.538054	7.573191	7.605697	7.635938	7.664210	7.690754	7.715768	7.739419	7.761849	8
53	7.500487	7.538663	7.573753	7.606219	7.636425	7.664666	7.691183	7.716173	7.739803	7.762213	7
54	7.501152	7.539272	7.574315	7.606740	7.636911	7.665122	7.691611	7.716577	7.740186	7.762577	6
55	7.501815	7.539880	7.574875	7.607260	7.637396	7.665577	7.692039	7.716981	7.740568	7.762940	5
56	7.502478	7.540487	7.575436	7.607780	7.637881	7.666031	7.692467	7.717385	7.740951	7.763304	4
57	7.503139	7.541093	7.575995	7.608299	7.638366	7.666485	7.692894	7.717789	7.741333	7.763667	3
58	7.503800	7.541698	7.576553	7.608818	7.638850	7.666939	7.693321	7.718192	7.741715	7.764029	2
59	7.504459	7.542303	7.577111	7.609336	7.639333	7.667392	7.693747	7.718594	7.742096	7.764392	1
60	7.505118	7.542906	7.577668	7.609853	7.639816	7.667844	7.694173	7.718997	7.742477	7.764754	0
	89° 49′	89° 48′	89° 47′	89° 46′	89° 45′	89° 44′	89° 43′	89° 42′	89° 41′	89° 40′	″

LOG COSINE TO SECONDS

LOG. SINE TO SECONDS.

′	0° 20′	0° 21′	0° 22′	0° 23′	0° 24′	0° 25′	0° 26′	0° 27′	0° 28′	0° 29′	″
0	7.764754	7.785943	7.806146	7.825451	7.843934	7.861662	7.878695	7.895085	7.910879	7.926119	60
1	7.765115	7.786287	7.806475	7.825765	7.844235	7.861952	7.878974	7.895353	7.911138	7.926368	59
2	7.765477	7.786631	7.806803	7.826080	7.844537	7.862241	7.879252	7.895621	7.911396	7.926618	58
3	7.765838	7.786975	7.807132	7.826394	7.844838	7.862530	7.879530	7.895889	7.911654	7.926867	57
4	7.766199	7.787319	7.807460	7.826708	7.845138	7.862819	7.879807	7.896156	7.911912	7.927116	56
5	7.766559	7.787663	7.807788	7.827021	7.845439	7.863107	7.880085	7.896424	7.912170	7.927365	55
6	7.766920	7.788006	7.808115	7.827335	7.845740	7.863396	7.880362	7.896691	7.912428	7.927614	54
7	7.767280	7.788349	7.808443	7.827648	7.846040	7.863684	7.880640	7.896958	7.912685	7.927863	53
8	7.767639	7.788691	7.808770	7.827961	7.846340	7.863972	7.880917	7.897225	7.912942	7.928111	52
9	7.767999	7.789034	7.809097	7.828274	7.846640	7.864260	7.881194	7.897491	7.913200	7.928359	51
10	7.768358	7.789376	7.809423	7.828586	7.846939	7.864548	7.881470	7.897758	7.913457	7.928608	50
11	7.768716	7.789718	7.809750	7.828899	7.847239	7.864835	7.881747	7.898024	7.913714	7.928856	49
12	7.769075	7.790059	7.810076	7.829211	7.847538	7.865123	7.882023	7.898290	7.913970	7.929104	48
13	7.769433	7.790400	7.810402	7.829523	7.847837	7.865410	7.882299	7.898556	7.914227	7.929352	47
14	7.769791	7.790741	7.810728	7.829834	7.848136	7.865697	7.882575	7.898822	7.914483	7.929599	46
15	7.770149	7.791082	7.811053	7.830146	7.848434	7.865984	7.882851	7.899088	7.914740	7.929847	45
16	7.770506	7.791423	7.811378	7.830457	7.848733	7.866270	7.883127	7.899354	7.914996	7.930094	44
17	7.770863	7.791763	7.811703	7.830768	7.849031	7.866556	7.883402	7.899619	7.915252	7.930341	43
18	7.771220	7.792103	7.812028	7.831079	7.849329	7.866843	7.883678	7.899884	7.915508	7.930588	42
19	7.771576	7.792443	7.812352	7.831389	7.849626	7.867129	7.883953	7.900149	7.915763	7.930835	41
20	7.771932	7.792782	7.812677	7.831700	7.849924	7.867414	7.884228	7.900414	7.916019	7.931082	40
21	7.772288	7.793121	7.813001	7.832010	7.850221	7.867700	7.884502	7.900679	7.916274	7.931329	39
22	7.772643	7.793460	7.813324	7.832319	7.850519	7.867986	7.884777	7.900943	7.916529	7.931575	38
23	7.772999	7.793799	7.813648	7.832629	7.850816	7.868271	7.885051	7.901208	7.916785	7.931822	37
24	7.773354	7.794137	7.813971	7.832939	7.851112	7.868556	7.885326	7.901472	7.917039	7.932068	36
25	7.773708	7.794475	7.814294	7.833248	7.851409	7.868841	7.885600	7.901736	7.917294	7.932314	35
26	7.774063	7.794813	7.814617	7.833557	7.851705	7.869125	7.885874	7.902000	7.917549	7.932560	34
27	7.774417	7.795151	7.814939	7.833866	7.852001	7.869410	7.886147	7.902264	7.917803	7.932806	33
28	7.774771	7.795488	7.815262	7.834174	7.852297	7.869694	7.886421	7.902527	7.918058	7.933052	32
29	7.775124	7.795825	7.815584	7.834482	7.852593	7.869978	7.886694	7.902791	7.918312	7.933297	31
30	7.775477	7.796162	7.815905	7.834791	7.852888	7.870262	7.886968	7.903054	7.918566	7.933543	30
31	7.775830	7.796498	7.816227	7.835098	7.853184	7.870546	7.887241	7.903317	7.918820	7.933788	29
32	7.776183	7.796834	7.816548	7.835406	7.853479	7.870830	7.887514	7.903580	7.919074	7.934033	28
33	7.776535	7.797170	7.816869	7.835714	7.853774	7.871113	7.887786	7.903843	7.919327	7.934278	27
34	7.776887	7.797506	7.817190	7.836021	7.854069	7.871396	7.888059	7.904106	7.919581	7.934523	26
35	7.777239	7.797842	7.817511	7.836328	7.854363	7.871679	7.888331	7.904368	7.919834	7.934768	25
36	7.777591	7.798177	7.817831	7.836635	7.854657	7.871962	7.888603	7.904630	7.920087	7.935012	24
37	7.777942	7.798512	7.818152	7.836941	7.854952	7.872245	7.888875	7.904893	7.920340	7.935257	23
38	7.778293	7.798847	7.818471	7.837248	7.855246	7.872527	7.889147	7.905155	7.920593	7.935501	22
39	7.778644	7.799181	7.818791	7.837554	7.855539	7.872809	7.889419	7.905417	7.920846	7.935745	21
40	7.778994	7.799515	7.819111	7.837860	7.855833	7.873092	7.889690	7.905678	7.921098	7.935989	20
41	7.779344	7.799849	7.819430	7.838165	7.856126	7.873373	7.889962	7.905940	7.921351	7.936233	19
42	7.779694	7.800183	7.819749	7.838471	7.856419	7.873655	7.890233	7.906201	7.921603	7.936477	18
43	7.780043	7.800516	7.820068	7.838776	7.856712	7.873937	7.890504	7.906462	7.921855	7.936721	17
44	7.780393	7.800850	7.820386	7.839081	7.857005	7.874218	7.890775	7.906723	7.922107	7.936964	16
45	7.780742	7.801182	7.820704	7.839386	7.857298	7.874499	7.891045	7.906984	7.922359	7.937208	15
46	7.781090	7.801515	7.821022	7.839691	7.857590	7.874780	7.891316	7.907245	7.922611	7.937451	14
47	7.781439	7.801847	7.821340	7.839995	7.857882	7.875061	7.891586	7.907506	7.922862	7.937694	13
48	7.781787	7.802180	7.821658	7.840300	7.858174	7.875342	7.891856	7.907766	7.923113	7.937937	12
49	7.782135	7.802512	7.821975	7.840604	7.858466	7.875622	7.892126	7.908026	7.923366	7.938180	11
50	7.782482	7.802843	7.822292	7.840907	7.858757	7.875902	7.892396	7.908287	7.923616	7.938422	10
51	7.782829	7.803175	7.822609	7.841211	7.859049	7.876183	7.892666	7.908547	7.923867	7.938665	9
52	7.783176	7.803506	7.822926	7.841514	7.859340	7.876462	7.892935	7.908806	7.924118	7.938907	8
53	7.783523	7.803837	7.823242	7.841818	7.859631	7.876742	7.893205	7.909066	7.924368	7.939150	7
54	7.783870	7.804167	7.823558	7.842120	7.859922	7.877022	7.893474	7.909326	7.924619	7.939392	6
55	7.784216	7.804498	7.823874	7.842423	7.860212	7.877301	7.893743	7.909585	7.924869	7.939634	5
56	7.784562	7.804828	7.824190	7.842726	7.860503	7.877580	7.894012	7.909844	7.925119	7.939876	4
57	7.784907	7.805158	7.824506	7.843028	7.860793	7.877859	7.894280	7.910103	7.925370	7.940117	3
58	7.785253	7.805487	7.824821	7.843330	7.861083	7.878138	7.894549	7.910362	7.925619	7.940359	2
59	7.785598	7.805817	7.825136	7.843632	7.861373	7.878417	7.894817	7.910621	7.925869	7.940600	1
60	7.785943	7.806146	7.825451	7.843934	7.861662	7.878695	7.895085	7.910879	7.926119	7.940842	0
″	89° 39′	89° 38′	89° 37′	89° 36′	89° 35′	89° 34′	89° 33	89° 32′	89° 31′	89° 30′	″

LOG. COSINE TO SECONDS.

LOG. SINE TO SECONDS.

"	0° 30′	0° 31′	0° 32′	0° 33′	0° 34′	0° 35′	0° 36′	0° 37	0° 38′	0° 39′	"
0	7.940842	7.955082	7.968870	7.982233	7.995198	8.007787	8.020021	8.031919	8.043501	8.054781	60
1	7.941083	7.955315	7.969096	7.982453	7.995411	8.007993	8.020222	8.032115	8.043691	8.054967	59
2	7.941324	7.955549	7.969322	7.982672	7.995623	8.008200	8.020423	8.032310	8.043892	8.055152	58
3	7.941565	7.955782	7.969548	7.982891	7.995836	8.008407	8.020623	8.032506	8.044072	8.055338	57
4	7.941806	7.956015	7.969774	7.983110	7.996049	8.008613	8.020824	8.032701	8.044262	8.055523	56
5	7.942046	7.956248	7.969999	7 983329	7.996261	8.008819	8.021025	8.032896	8.044452	8.055708	55
6	7.942287	7.956481	7.970225	7.983547	7.996473	8.009026	8.021225	8.033092	8.044642	8.055893	54
7	7.942527	7.956713	7.970450	7.983766	7.996686	8.009232	8.021426	8.033287	8.044832	8.056079	53
8	7.942768	7.956946	7.970676	7.983984	7.996898	8.009438	8.021626	8.033482	8.045022	8.056264	52
9	7.943008	7.957178	7.970901	7.984203	7.997110	8.009644	8.021826	8.033676	8.045212	8.056448	51
10	7.943248	7.957410	7.971126	7.984421	7.997322	8.009850	8.022027	8.033871	8.045401	8.056633	50
11	7.943488	7.957643	7.971351	7.984639	7.997533	8.010055	8.022227	8.034066	8.045591	8.056818	49
12	7.943727	7.957875	7.971576	7.984857	7.997745	8.010261	8.022427	8.034261	8.045780	8.057003	48
13	7.943967	7.958107	7.971800	7.985075	7.997957	8.010467	8.022627	8.034455	8.045970	8.057187	47
14	7.944207	7.958338	7.972025	7.985293	7.998168	8.010672	8.022826	8.034649	8.046159	8.057372	46
15	7.944446	7.958570	7.972249	7.985511	7.998379	8.010878	8.023026	8.034844	8.046349	8.057556	45
16	7.944685	7.958802	7.972474	7.985729	7.998591	8.011083	8.023226	8.035038	8.046538	8.057741	44
17	7.944924	7.959033	7.972698	7.985946	7.998802	8.011288	8.023425	8.035232	8.046727	8.057925	43
18	7.945163	7.959264	7.972922	7.986164	7.999013	8.011493	8.023625	8.035426	8.046916	8.058109	42
19	7.945402	7.959496	7.973146	7.986381	7.999224	8.011698	8.023824	8.035620	8.047105	8.058293	41
20	7.945641	7.959727	7.973370	7.986598	7.999435	8.011903	8.024023	8.035814	8.047294	8.058477	40
21	7.945879	7.959958	7.973594	7.986815	7.999646	8.012108	8.024222	8.036008	8.047482	8.058661	39
22	7.946118	7 960188	7.973818	7.987032	7.999856	8.012313	8.024421	8.036202	8.047671	8.058845	38
23	7.946356	7.960419	7.974041	7.987249	8.000067	8.012517	8.024620	8.036396	8.047860	8.059029	37
24	7.946594	7.960650	7.974265	7.987466	8.000277	8.012722	8.024819	8.036589	8.048048	8.059213	36
25	7.946832	7.960880	7.974488	7.987682	8.000488	8.012926	8.025018	8.036783	8.048237	8.059396	35
26	7.947070	7.961110	7.974711	7.987899	8.000698	8.013130	8.025217	8.036976	8.048425	8.059580	34
27	7.947308	7.961341	7.974934	7.988115	8.000908	8.013335	8.025415	8.037169	8.048613	8.059764	33
28	7.947545	7.961571	7.975157	7.988332	8.001118	8.013539	8.025614	8.037363	8.048802	8.059947	32
29	7.947783	7.961801	7.975380	7.988548	8.001328	8.013743	8.025812	8.037556	8.048990	8.060130	31
30	7.948020	7.962031	7.975603	7.988764	8.001538	8.013947	8.026011	8.037749	8.049178	8.060314	30
31	7.948257	7.962260	7.975826	7.988980	8.001748	8.014151	8.026209	8.037942	8.049366	8.060497	29
32	7.948495	7.962490	7.976048	7.989196	8.001957	8.014354	8.026407	8.038135	8.049554	8.060680	28
33	7.948732	7.962719	7.976271	7.989412	8.002167	8.014558	8.026605	8.038327	8.049741	8.060863	27
34	7.948968	7.962949	7.976493	7.989627	8.002376	8.014761	8.026803	8.038520	8.049929	8.061046	26
35	7.949205	7.963178	7.976715	7.989843	8.002586	8.014965	8.027001	8.038713	8.050117	8.061229	25
36	7.949442	7.963407	7.976937	7.990058	8.002795	8.015168	8.027199	8.038905	8.050304	8.061412	24
37	7.949678	7.963636	7.977159	7.990274	8.003004	8.015372	8.027397	8.039098	8.050492	8.061594	23
38	7.949915	7.963865	7.977381	7.990489	8.003213	8.015575	8.027594	8.039290	8.050679	8.061777	22
39	7.950151	7.964094	7.977603	7.990704	8.003422	8.015778	8.027792	8.039482	8.050866	8.061960	21
40	7.950387	7.964322	7.977824	7.990919	8.003631	8.015981	8.027989	8.039675	8.051054	8.062142	20
41	7.950623	7.964551	7.978046	7.991134	8.003840	8.016184	8.028187	8.039867	8.051241	8.062325	19
42	7.950859	7.964779	7.978267	7.991349	8.004048	8.016386	8.028384	8.040059	8.051428	8.062507	18
43	7.951094	7.965007	7.978489	7.991564	8.004257	8.016589	8.028581	8.040251	8.051615	8.062689	17
44	7.951330	7.965236	7.978710	7.991778	8.004465	8.016792	8.028778	8.040443	8.051802	8.062871	16
45	7.951565	7.965464	7.978931	7.991993	8.004673	8.016994	8.028975	8.040634	8.051989	8.063054	15
46	7.951801	7.965692	7.979152	7.992207	8.004882	8.017197	8.029172	8.040826	8.052175	8.063236	14
47	7.952036	7.965919	7.979373	7.992422	8.005090	8.017399	8.029369	8.041018	8.052362	8.063418	13
48	7.952271	7.966147	7.979593	7.992636	8.005298	8.017601	8.029566	8.041209	8.052549	8.063599	12
49	7.952506	7.966375	7.979814	7.992850	8.005506	8.017803	8.029762	8.041401	8.052735	8.063781	11
50	7.952741	7.966602	7.980034	7.993064	8.005714	8.018005	8.029959	8.041592	8.052922	8.063963	10
51	7.952975	7.966829	7.980255	7.993278	8.005921	8.018207	8.030155	8.041783	8.053108	8.064145	9
52	7.953210	7.967056	7.980475	7.993491	8.006129	8.018409	8.030352	8.041974	8.053294	8.064326	8
53	7.953444	7.967284	7.980695	7.993705	8.006337	8.018611	8.030548	8.042165	8.053480	8.064508	7
54	7.953679	7.967511	7.980915	7.993919	8.006544	8.018813	8.030744	8.042356	8.053666	8.064689	6
55	7.953913	7.967737	7.981135	7.994132	8.006751	8.019014	8.030940	8.042547	8.053852	8.064871	5
56	7.954147	7.967964	7.981355	7.994346	8.006959	8.019216	8.031136	8.042738	8.054038	8.065052	4
57	7.954381	7.968191	7.981575	7.994559	8.007166	8.019417	8.031332	8.042929	8.054224	8.065233	3
58	7.954615	7.968417	7.981794	7.994772	8.007373	8.019618	8.031528	8.043120	8.054410	8.065414	2
59	7.954848	7.968644	7.982014	7.994985	8.007580	8.019820	8.031724	8.043310	8.054596	8.065595	1
60	7.955082	7.968870	7.982233	7.995198	8.007787	8.020021	8.031919	8.043501	8.054781	8.065776	0
′	89° 30′	89° 29′	89° 28′	89° 27′	89° 26′	89° 25′	89° 24′	89° 23′	89° 22′	89° 21′	89° 20′	′

LOG. COSINE TO SECONDS.

LOG. SINE TO SECONDS.

"	0° 40′	0° 41′	0° 42′	0° 43′	0° 44′	0° 45′	0° 46′	0° 47′	0° 48′	0° 49′	"
0	8.065776	8.076500	8.086965	8.097183	8.107167	8.116926	8.126471	8.135810	8.144953	8.153907	60
1	8.065957	8.076676	8.087137	8.097351	8.107331	8.117087	8.126628	8.135964	8.145104	8.154055	59
2	8.066138	8.076853	8.087309	8.097520	8.107496	8.117248	8.126786	8.136118	8.145255	8.154203	58
3	8.066319	8.077029	8.087481	8.097688	8.107660	8.117408	8.126943	8.136272	8.145405	8.154350	57
4	8.066499	8.077205	8.087653	8.097856	8.107824	8.117569	8.127100	8.136426	8.145556	8.154498	56
5	8.066680	8.077381	8.087825	8.098024	8.107989	8.117730	8.127257	8.136580	8.145706	8.154645	55
6	8.066861	8.077558	8.087997	8.098192	8.108153	8.117890	8.127414	8.136733	8.145857	8.154793	54
7	8.067041	8.077734	8.088169	8.098360	8.108317	8.118051	8.127571	8.136887	8.146007	8.154940	53
8	8.067221	8.077910	8.088341	8.098528	8.108481	8.118211	8.127728	8.137041	8.146158	8.155088	52
9	8.067402	8.078086	8.088513	8.098695	8.108645	8.118371	8.127885	8.137194	8.146308	8.155235	51
10	8.067582	8.078261	8.088684	8.098863	8.108809	8.118532	8.128042	8.137348	8.146458	8.155382	50
11	8.067762	8.078437	8.088856	8.099031	8.108973	8.118692	8.128198	8.137501	8.146609	8.155529	49
12	8.067942	8.078613	8.089028	8.099198	8.109136	8.118852	8.128355	8.137654	8.146759	8.155676	48
13	8.068122	8.078789	8.089199	8.099366	8.109300	8.119012	8.128512	8.137808	8.146909	8.155823	47
14	8.068302	8.078964	8.089371	8.099533	8.109464	8.119172	8.128668	8.137961	8.147059	8.155970	46
15	8.068482	8.079140	8.089542	8.099701	8.109627	8.119332	8.128825	8.138114	8.147209	8.156117	45
16	8.068662	8.079315	8.089713	8.099868	8.109791	8.119492	8.128981	8.138267	8.147359	8.156264	44
17	8.068842	8.079490	8.089884	8.100035	8.109954	8.119652	8.129138	8.138420	8.147509	8.156411	43
18	8.069021	8.079666	8.090055	8.100202	8.110118	8.119812	8.129294	8.138574	8.147659	8.156558	42
19	8.069201	8.079841	8.090227	8.100370	8.110281	8.119971	8.129450	8.138726	8.147809	8.156705	41
20	8.069380	8.080016	8.090398	8.100537	8.110444	8.120131	8.129606	8.138879	8.147959	8.156852	40
21	8.069560	8.080191	8.090568	8.100704	8.110608	8.120291	8.129763	8.139032	8.148108	8.156998	39
22	8.069739	8.080366	8.090739	8.100871	8.110771	8.120450	8.129919	8.139185	8.148258	8.157145	38
23	8.069918	8.080541	8.090910	8.101037	8.110934	8.120610	8.130075	8.139338	8.148408	8.157292	37
24	8.070097	8.080716	8.091081	8.101204	8.111097	8.120769	8.130231	8.139491	8.148557	8.157438	36
25	8.070277	8.080891	8.091252	8.101371	8.111260	8.120929	8.130387	8.139643	8.148707	8.157585	35
26	8.070456	8.081065	8.091422	8.101538	8.111423	8.121088	8.130543	8.139796	8.148856	8.157731	34
27	8.070635	8.081240	8.091593	8.101704	8.111586	8.121247	8.130699	8.139948	8.149005	8.157877	33
28	8.070813	8.081415	8.091763	8.101871	8.111749	8.121407	8.130854	8.140101	8.149155	8.158024	32
29	8.070992	8.081589	8.091934	8.102037	8.111911	8.121566	8.131010	8.140253	8.149304	8.158170	31
30	8.071171	8.081764	8.092104	8.102204	8.112074	8.121725	8.131166	8.140406	8.149453	8.158316	30
31	8.071350	8.081938	8.092274	8.102370	8.112237	8.121884	8.131321	8.140558	8.149603	8.158462	29
32	8.071528	8.082112	8.092444	8.102536	8.112399	8.122043	8.131477	8.140710	8.149752	8.158609	28
33	8.071707	8.082287	8.092615	8.102703	8.112562	8.122202	8.131632	8.140863	8.149901	8.158755	27
34	8.071885	8.082461	8.092785	8.102869	8.112724	8.122361	8.131788	8.141015	8.150050	8.158901	26
35	8.072064	8.082635	8.092955	8.103035	8.112886	8.122519	8.131943	8.141167	8.150199	8.159047	25
36	8.072242	8.082809	8.093125	8.103201	8.113049	8.122678	8.132099	8.141319	8.150348	8.159193	24
37	8.072420	8.082983	8.093294	8.103367	8.113211	8.122837	8.132254	8.141471	8.150497	8.159339	23
38	8.072598	8.083157	8.093464	8.103533	8.113373	8.122996	8.132409	8.141623	8.150646	8.159484	22
39	8.072776	8.083330	8.093634	8.103699	8.113535	8.123154	8.132564	8.141775	8.150794	8.159630	21
40	8.072955	8.083504	8.093804	8.103864	8.113697	8.123313	8.132720	8.141927	8.150943	8.159776	20
41	8.073132	8.083678	8.093973	8.104030	8.113859	8.123471	8.132875	8.142079	8.151092	8.159922	19
42	8.073310	8.083851	8.094143	8.104196	8.114021	8.123629	8.133030	8.142231	8.151241	8.160067	18
43	8.073488	8.084025	8.094312	8.104361	8.114183	8.123788	8.133185	8.142382	8.151389	8.160213	17
44	8.073666	8.084198	8.094482	8.104527	8.114345	8.123946	8.133339	8.142534	8.151538	8.160358	16
45	8.073844	8.084372	8.094651	8.104692	8.114507	8.124104	8.133494	8.142685	8.151686	8.160504	15
46	8.074021	8.084545	8.094820	8.104858	8.114669	8.124263	8.133649	8.142837	8.151835	8.160649	14
47	8.074199	8.084718	8.094989	8.105023	8.114830	8.124421	8.133804	8.142989	8.151983	8.160795	13
48	8.074376	8.084892	8.095159	8.105188	8.114992	8.124579	8.133959	8.143140	8.152131	8.160940	12
49	8.074553	8.085065	8.095328	8.105354	8.115153	8.124737	8.134113	8.143291	8.152280	8.161086	11
50	8.074731	8.085238	8.095497	8.105519	8.115315	8.124895	8.134268	8.143443	8.152428	8.161231	10
51	8.074908	8.085411	8.095666	8.105684	8.115476	8.125053	8.134422	8.143594	8.152576	8.161376	9
52	8.075085	8.085584	8.095835	8.105849	8.115638	8.125210	8.134577	8.143745	8.152724	8.161521	8
53	8.075262	8.085757	8.096003	8.106014	8.115799	8.125368	8.134731	8.143896	8.152872	8.161666	7
54	8.075439	8.085929	8.096172	8.106179	8.115960	8.125526	8.134885	8.144045	8.153020	8.161811	6
55	8.075616	8.086102	8.096341	8.106344	8.116121	8.125684	8.135040	8.144199	8.153168	8.161956	5
56	8.075793	8.086275	8.096509	8.106508	8.116282	8.125841	8.135194	8.144350	8.153316	8.162101	4
57	8.075970	8.086447	8.096678	8.106673	8.116443	8.125999	8.135348	8.144501	8.153464	8.162246	3
58	8.076146	8.086620	8.096846	8.106838	8.116604	8.126156	8.135502	8.144652	8.153612	8.162391	2
59	8.076323	8.086792	8.097015	8.107002	8.116765	8.126314	8.135656	8.144802	8.153760	8.162536	1
60	8.076500	8.086965	8.097185	8.107167	8.116926	8.126471	8.135810	8.144953	8.153907	8.162681	0
"	89° 19′	89° 18′	89° 17′	89° 16′	89° 15′	89° 14′	89° 13′	89° 12′	89° 11′	89° 10′	"

LOG. COSINE TO SECONDS.

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
		0^h or 0^m.		LOG. SINES, &c.				0 deg.	
0	0	0.000000	Infinite.	0.000000	Infinite.	10.000000	10.000000	60	60
1	15	5.861666	14.138334	5.861666	14.138334	10.000000	10.000000	45	59
2	30	6.162696	13.837304	6.162696	13.837304	10.000000	10.000000	30	58
3	45	6.338787	13.661213	6.338787	13.661213	10.000000	10.000000	15	57
4	1	6.463726	13.536274	6.463726	13.536274	10.000000	10.000000	59	56
5	15	6.560636	13.439364	6.560636	13.439364	10.000000	10.000000	45	55
6	30	6.639817	13.360183	6.639817	13.360183	10.000000	10.000000	30	54
7	45	6.706764	13.293236	6.706764	13.293236	10.000000	10.000000	15	53
8	2	6.764756	13.235244	6.764756	13.235244	10.000000	10.000000	58	52
9	15	6.815909	13.184091	6.815909	13.184091	10.000000	10.000000	45	51
10	30	6.861666	13.138334	6.861666	13.138334	10.000000	10.000000	30	50
11	45	6.903059	13.096941	6.903059	13.096941	10.000000	10.000000	15	49
12	3	6.940847	13.059153	6.940847	13.059153	10.000000	10.000000	57	48
13	15	6.975609	13.024391	6.975610	13.024390	10.000000	10.000000	45	47
14	30	7.007794	12.992206	7.007794	12.992206	10.000000	10.000000	30	46
15	45	7.037757	12.962243	7.037758	12.962242	10.000000	10.000000	15	45
16	4	7.065786	12.934214	7.065786	12.934214	10.000000	10.000000	56	44
17	15	7.092115	12.907885	7.092115	12.907885	10.000000	10.000000	45	43
18	30	7.116938	12.883062	7.116939	12.883061	10.000000	10.000000	30	42
19	45	7.140420	12.859580	7.140420	12.859580	10.000000	10.000000	15	41
20	5	7.162696	12.837304	7.162696	12.837304	10.000000	10.000000	55	40
21	15	7.183885	12.816115	7.183886	12.816114	10.000000	10.000000	45	39
22	30	7.204089	12.795911	7.204089	12.795911	10.000000	10.000000	30	38
23	45	7.223394	12.776606	7.223394	12.776606	10.000001	9.999999	15	37
24	6	7.241877	12.758123	7.241878	12.758122	10.000001	9.999999	54	36
25	15	7.259606	12.740394	7.259607	12.740393	10.000001	9.999999	45	35
26	30	7.276639	12.723361	7.276640	12.723360	10.000001	9.999999	30	34
27	45	7.293030	12.706970	7.293030	12.706970	10.000001	9.999999	15	33
28	7	7.308824	12.691176	7.308825	12.691175	10.000001	9.999999	53	32
29	15	7.324064	12.675936	7.324065	12.675935	10.000001	9.999999	45	31
30	30	7.338787	12.661213	7.338788	12.661212	10.000001	9.999999	30	30
31	45	7.353027	12.646973	7.353029	12.646971	10.000001	9.999999	15	29
32	8	7.366816	12.633184	7.366817	12.633183	10.000001	9.999999	52	28
33	15	7.380180	12.619820	7.380181	12.619819	10.000001	9.999999	45	27
34	30	7.393145	12.606855	7.393146	12.606854	10.000001	9.999999	30	26
35	45	7.405734	12.594266	7.405735	12.594265	10.000002	9.999999	15	25
36	9	7.417968	12.582032	7.417970	12.582030	10.000002	9.999998	51	24
37	15	7.429867	12.570133	7.429869	12.570131	10.000002	9.999998	45	23
38	30	7.441449	12.558551	7.441451	12.558549	10.000002	9.999998	30	22
39	45	7.452730	12.547270	7.452732	12.547268	10.000002	9.999998	15	21
40	10	7.463725	12.536275	7.463727	12.536273	10.000002	9.999998	50	20
41	15	7.474449	12.525551	7.474451	12.525549	10.000002	9.999998	45	19
42	30	7.484915	12.515085	7.484917	12.515083	10.000002	9.999998	30	18
43	45	7.495134	12.504866	7.495136	12.504864	10.000002	9.999998	15	17
44	11	7.505118	12.494882	7.505120	12.494880	10.000002	9.999998	49	16
45	15	7.514878	12.485122	7.514880	12.485120	10.000002	9.999998	45	15
46	30	7.524423	12.475577	7.524426	12.475574	10.000002	9.999998	30	14
47	45	7.533763	12.466237	7.533766	12.466234	10.000003	9.999997	15	13
48	12	7.542906	12.457094	7.542909	12.457091	10.000003	9.999997	48	12
49	15	7.551861	12.448139	7.551864	12.448136	10.000003	9.999997	45	11
50	30	7.560635	12.439365	7.560638	12.439362	10.000003	9.999997	30	10
51	45	7.569235	12.430765	7.569238	12.430762	10.000003	9.999997	15	9
52	13	7.577668	12.422332	7.577671	12.422329	10.000003	9.999997	47	8
53	15	7.585941	12.414059	7.585944	12.414056	10.000003	9.999997	45	7
54	30	7.594059	12.405941	7.594062	12.405938	10.000004	9.999996	30	6
55	45	7.602028	12.397972	7.602031	12.397969	10.000004	9.999996	15	5
56	14	7.609853	12.390147	7.609857	12.390143	10.000004	9.999996	46	4
57	15	7.617540	12.382460	7.617543	12.382457	10.000004	9.999996	45	3
58	30	7.625093	12.374907	7.625097	12.374903	10.000004	9.999996	30	2
59	45	7.632517	12.367483	7.632521	12.367479	10.000004	9.999996	15	1
60	15	7.639816	12.360184	7.639820	12.360180	10.000004	9 999996	45	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant	sine.	″ ′	sec.
		5^h 59^m.		LOG. SINES, &c.				89 deg.	

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	′ ″	sec.
	$0^h\ 1^m$.		LOG. SINES, &c.					0 deg.	
0	15	7.639816	12.360184	7.639820	12.360180	10.000004	9.999996	45	60
1	15	7.646994	12.353006	7.646999	12.353001	10.000004	9.999996	45	59
2	30	7.654056	12.345944	7.654061	12.345939	10.000004	9.999996	30	58
3	45	7.661005	12.338995	7.661010	12.338990	10.000005	9.999995	15	57
4	16	7.667844	12.332156	7.667849	12.332151	10.000005	9.999995	44	56
5	15	7.674578	12.325422	7.674583	12.325417	10.000005	9.999995	45	55
6	30	7.681208	12.318792	7.681213	12.318787	10.000005	9.999995	30	54
7	45	7.687739	12.312261	7.687744	12.312256	10.000005	9.999995	15	53
8	17	7.694173	12.305827	7.694179	12.305821	10.000005	9.999995	43	52
9	15	7.700513	12.299487	7.700519	12.299481	10.000006	9.999994	45	51
10	30	7.706762	12.293238	7.706768	12.293232	10.000006	9.999994	30	50
11	45	7.712922	12.287078	7.712928	12.287072	10.000006	9.999994	15	49
12	18	7.718997	12.281003	7.719003	12.280997	10.000006	9.999994	42	48
13	15	7.724987	12.275013	7.724993	12.275007	10.000006	9.999994	45	47
14	30	7.730896	12.269104	7.730902	12.269098	10.000006	9.999994	30	46
15	45	7.736725	12.263275	7.736732	12.263268	10.000007	9.999993	15	45
16	19	7.742477	12.257523	7.742484	12.257516	10.000007	9.999993	41	44
17	15	7.748155	12.251845	7.748161	12.251839	10.000007	9.999993	45	43
18	30	7.753758	12.246242	7.753765	12.246235	10.000007	9.999993	30	42
19	45	7.759291	12.240709	7.759298	12.240702	10.000007	9.999993	15	41
20	20	7.764754	12.235246	7.764761	12.235239	10.000007	9.999993	40	40
21	15	7.770149	12.229851	7.770156	12.229844	10.000008	9.999992	45	39
22	30	7.775477	12.224523	7.775485	12.224515	10.000008	9.999992	30	38
23	45	7.780742	12.219258	7.780749	12.219251	10.000008	9.999992	15	37
24	21	7.785943	12.214057	7.785951	12.214049	10.000008	9.999992	39	36
25	15	7.791082	12.208918	7.791091	12.208909	10.000008	9.999992	45	35
26	30	7.796162	12.203838	7.796170	12.203830	10.000009	9.999991	30	34
27	45	7.801182	12.198818	7.801191	12.198809	10.000009	9.999991	15	33
28	22	7.806146	12.193854	7.806155	12.193845	10.000009	9.999991	38	32
29	15	7.811053	12.188947	7.811062	12.188938	10.000009	9.999991	45	31
30	30	7.815905	12.184095	7.815915	12.184085	10.000009	9.999991	30	30
31	45	7.820704	12.179296	7.820714	12.179286	10.000010	9.999990	15	29
32	23	7.825451	12.174549	7.825460	12.174540	10.000010	9.999990	37	28
33	15	7.830146	12.169854	7.830156	12.169844	10.000010	9.999990	45	27
34	30	7.834791	12.165209	7.834801	12.165199	10.000010	9.999990	30	26
35	45	7.839386	12.160614	7.839397	12.160603	10.000010	9.999990	15	25
36	24	7.843934	12.156066	7.843944	12.156056	10.000011	9.999989	36	24
37	15	7.848434	12.151566	7.848445	12.151555	10.000011	9.999989	45	23
38	30	7.852888	12.147112	7.852900	12.147100	10.000011	9.999989	30	22
39	45	7.857298	12.142702	7.857309	12.142691	10.000011	9.999989	15	21
40	25	7.861662	12.138338	7.861674	12.138326	10.000012	9.999988	35	20
41	15	7.865984	12.134016	7.865995	12.134005	10.000012	9.999988	45	19
42	30	7.870262	12.129738	7.870274	12.129726	10.000012	9.999988	30	18
43	45	7.874499	12.125501	7.874511	12.125489	10.000012	9.999988	15	17
44	26	7.878695	12.121305	7.878708	12.121292	10.000012	9.999988	34	16
45	15	7.882851	12.117149	7.882864	12.117136	10.000013	9.999987	45	15
46	30	7.886968	12.113032	7.886981	12.113019	10.000013	9.999987	30	14
47	45	7.891045	12.108955	7.891059	12.108941	10.000013	9.999987	15	13
48	27	7.895085	12.104915	7.895099	12.104901	10.000013	9.999987	33	12
49	15	7.899088	12.100912	7.899102	12.100898	10.000014	9.999986	45	11
50	30	7.903054	12.096946	7.903068	12.096932	10.000014	9.999986	30	10
51	45	7.906984	12.093016	7.906998	12.093002	10.000014	9.999986	15	9
52	28	7.910879	12.089121	7.910895	12.089106	10.000014	9.999986	32	8
53	15	7.914740	12.085260	7.914754	12.085246	10.000015	9.999985	45	7
54	30	7.918566	12.081434	7.918581	12.081419	10.000015	9.999985	30	6
55	45	7.922359	12.077641	7.922374	12.077626	10.000015	9.999985	15	5
56	29	7.926119	12.073881	7.926134	12.073866	10.000016	9.999984	31	4
57	15	7.929847	12.070153	7.929862	12.070138	10.000016	9.999984	45	3
58	30	7.933543	12.066457	7.933559	12.066441	10.000016	9.999984	30	2
59	45	7.937208	12.062792	7.937224	12.062776	10.000016	9.999984	15	1
60	30	7.940842	12.059158	7.940858	12.059142	10.000017	9.999983	30	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$5^h\ 58^m$.		LOG. SINES, &c.					89 deg.	

sec.	′ ″	sine.	cosecant.	tangent	cotangent.	secant.	cosine.	″ ′	sec.
	$0^h\ 2^m$.		LOG. SINES, &c.				0 deg.		
0	30	7.940842	12.059158	7.940858	12.059142	10.000017	9.999983	30	60
1	15	7.944446	12.055554	7.944463	12.055537	10.000017	9.999983	45	59
2	30	7.948020	12.051980	7.948037	12.051963	10.000017	9.999983	30	58
3	45	7.951565	12.048435	7.951583	12.048417	10.000017	9.999983	15	57
4	31	7.955082	12.044918	7.955100	12.044900	10.000018	9.999982	29	56
5	15	7.958570	12.041430	7.958588	12.041412	10.000018	9.999982	45	55
6	30	7.962031	12.037969	7.962049	12.037951	10.000018	9.999982	30	54
7	45	7.965464	12.034536	7.965482	12.034518	10.000019	9.999981	15	53
8	32	7.968870	12.031130	7.968889	12.031111	10.000019	9.999981	28	52
9	15	7.972249	12.027751	7.972269	12.027731	10.000019	9.999981	45	51
10	30	7.975603	12.024397	7.975622	12.024378	10.000019	9.999981	30	50
11	45	7.978931	12.021069	7.978951	12.021049	10.000020	9.999980	15	49
12	33	7.982233	12.017767	7.982253	12.017747	10.000020	9.999980	27	48
13	15	7.985511	12.014489	7.985531	12.014469	10.000020	9.999980	45	47
14	30	7.988764	12.011236	7.988785	12.011215	10.000021	9.999979	30	46
15	45	7.991993	12.008007	7.992014	12.007986	10.000021	9.999979	15	45
16	34	7.995198	12.004802	7.995219	12.004781	10.000021	9.999979	26	44
17	15	7.998379	12.001621	7.998401	12.001599	10.000022	9.999978	45	43
18	30	8.001538	11.998462	8.001560	11.998440	10.000022	9.999978	30	42
19	45	8.004673	11.995327	8.004696	11.995304	10.000022	9.999978	15	41
20	35	8.007787	11.992213	8.007809	11.992191	10.000023	9.999977	25	40
21	15	8.010878	11.989122	8.010900	11.989099	10.000023	9.999977	45	39
22	30	8.013947	11.986053	8.013970	11.986030	10.000023	9.999977	30	38
23	45	8.016994	11.983006	8.017018	11.982982	10.000024	9.999976	15	37
24	36	8.020021	11.979979	8.020044	11.979955	10.000024	9.999976	24	36
25	15	8.023026	11.976974	8.023050	11.976950	10.000024	9.999976	45	35
26	30	8.026011	11.973989	8.026035	11.973965	10.000025	9.999975	30	34
27	45	8.028975	11.971025	8.029000	11.971000	10.000025	9.999975	15	33
28	37	8.031919	11.968081	8.031945	11.968055	10.000025	9.999975	23	32
29	15	8.034844	11.965156	8.034869	11.965131	10.000026	9.999974	45	31
30	30	8.037749	11.962251	8.037775	11.962225	10.000026	9.999974	30	30
31	45	8.040634	11.959366	8.040650	11.959339	10.000026	9.999974	15	29
32	38	8.043501	11.956499	8.043527	11.956473	10.000027	9.999973	22	28
33	15	8.046349	11.953651	8.046375	11.953624	10.000027	9.999973	45	27
34	30	8.049178	11.950822	8.049205	11.950795	10.000027	9.999973	30	26
35	45	8.051989	11.948011	8.052016	11.947984	10.000028	9.999972	15	25
36	39	8.054781	11.945219	8.054809	11.945191	10.000028	9.999972	21	24
37	15	8.057556	11.942444	8.057585	11.942415	10.000028	9.999972	45	23
38	30	8.060314	11.939686	8.060342	11.939658	10.000029	9.999971	30	22
39	45	8.063054	11.936946	8.063083	11.936917	10.000029	9.999971	15	21
40	40	8.065776	11.934224	8.065806	11.934194	10.000029	9.999971	20	20
41	15	8.068482	11.931518	8.068512	11.931488	10.000030	9.999970	45	19
42	30	8.071171	11.928829	8.071201	11.928799	10.000030	9.999970	30	18
43	45	8.073844	11.926156	8.073874	11.926126	10.000031	9.999969	15	17
44	41	8.076500	11.923500	8.076531	11.923469	10.000031	9.999969	19	16
45	15	8.079140	11.920860	8.079171	11.920829	10.000031	9.999969	45	15
46	30	8.081764	11.918236	8.081795	11.918205	10.000032	9.999968	30	14
47	45	8.084372	11.915628	8.084404	11.915596	10.000032	9.999968	15	13
48	42	8.086965	11.913035	8.086997	11.913003	10.000032	9.999968	18	12
49	15	8.089542	11.910458	8.089575	11.910425	10.000033	9.999967	45	11
50	30	8.092104	11.907896	8.092137	11.907863	10.000033	9.999967	30	10
51	45	8.094651	11.905349	8.094685	11.905315	10.000034	9.999966	15	9
52	43	8.097183	11.902817	8.097217	11.902783	10.000034	9.999966	17	8
53	15	8.099701	11.900299	8.099735	11.900265	10.000034	9.999966	45	7
54	30	8.102204	11.897796	8.102239	11.897761	10.000035	9.999965	30	6
55	45	8.104692	11.895308	8.104728	11.895272	10.000035	9.999965	15	5
56	44	8.107167	11.892833	8.107202	11.892797	10.000036	9.999964	16	4
57	15	8.109627	11.890373	8.109663	11.890337	10.000036	9.999964	45	3
58	30	8.112074	11.887926	8.112110	11.887890	10.000036	9.999964	30	2
59	45	8.114507	11.885493	8.114544	11.885456	10.000037	9.999963	15	1
60	45	8.116926	11.883074	8.116963	11.883037	10.000037	9.999963	15	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$5^h\ 57^m$.		LOG. SINES, &c.				89 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	$0^h\ 3^m$.		LOG. SINES, &c.				0 deg.		
0	45	8.116926	11.883074	8.116963	11.883037	10.000037	9.999963	15	60
1	15	8.119332	11.880668	8.119370	11.880630	10.000038	9.999962	45	59
2	30	8.121725	11.878275	8.121763	11.878237	10.000038	9.999962	30	58
3	45	8.124104	11.875896	8.124143	11.875857	10.000039	9.999961	15	57
4	46	8.126471	11.873529	8.126510	11.873490	10.000039	9.999961	14	56
5	15	8.128825	11.871175	8.128864	11.871136	10.000039	9.999961	45	55
6	30	8.131166	11.868834	8.131206	11.868794	10.000040	9.999960	30	54
7	45	8.133494	11.866506	8.133534	11.866465	10.000040	9.999960	15	53
8	47	8.135810	11.864190	8.135851	11.864149	10.000041	9.999959	13	52
9	15	8.138114	11.861886	8.138155	11.861845	10.000041	9.999959	45	51
10	30	8.140406	11.859594	8.140447	11.859553	10.000042	9.999958	30	50
11	45	8.142685	11.857315	8.142727	11.857273	10.000042	9.999958	15	49
12	48	8.144953	11.855047	8.144996	11.855004	10.000042	9.999958	12	48
13	15	8.147209	11.852791	8.147252	11.852748	10.000043	9.999957	45	47
14	30	8.149453	11.850547	8.149497	11.850503	10.000043	9.999957	30	46
15	45	8.151686	11.848314	8.151730	11.848270	10.000044	9.999956	15	45
16	49	8.153907	11.846093	8.153952	11.846048	10.000044	9.999956	11	44
17	15	8.156117	11.843883	8.156162	11.843838	10.000045	9.999955	45	43
18	30	8.158316	11.841684	8.158361	11.841639	10.000045	9.999955	30	42
19	45	8.160504	11.839496	8.160549	11.839450	10.000046	9.999954	15	41
20	50	8.162681	11.837319	8.162727	11.837273	10.000046	9.999954	10	40
21	15	8.164847	11.835153	8.164893	11.835107	10.000046	9.999954	45	39
22	30	8.167002	11.832998	8.167049	11.832951	10.000047	9.999953	30	38
23	45	8.169146	11.830854	8.169194	11.830806	10.000047	9.999953	15	37
24	51	8.171280	11.828720	8.171328	11.828672	10.000048	9.999952	9	36
25	15	8.173404	11.826596	8.173452	11.826548	10.000048	9.999952	45	35
26	30	8.175517	11.824483	8.175566	11.824434	10.000049	9.999951	30	34
27	45	8.177620	11.822380	8.177669	11.822331	10.000049	9.999951	15	33
28	52	8.179713	11.820287	8.179763	11.820237	10.000050	9.999950	8	32
29	15	8.181796	11.818204	8.181846	11.818154	10.000050	9.999950	45	31
30	30	8.183868	11.816132	8.183919	11.816081	10.000051	9.999949	30	30
31	45	8.185931	11.814069	8.185983	11.814017	10.000051	9.999949	15	29
32	53	8.187985	11.812015	8.188036	11.811964	10.000052	9.999948	7	28
33	15	8.190028	11.809972	8.190080	11.809919	10.000052	9.999948	45	27
34	30	8.192062	11.807938	8.192115	11.807885	10.000053	9.999947	30	26
35	45	8.194087	11.805913	8.194140	11.805860	10.000053	9.999947	15	25
36	54	8.196102	11.803898	8.196156	11.803844	10.000054	9.999946	6	24
37	15	8.198108	11.801892	8.198162	11.801838	10.000054	9.999946	45	23
38	30	8.200104	11.799896	8.200159	11.799841	10.000055	9.999945	30	22
39	45	8.202092	11.797908	8.202147	11.797853	10.000055	9.999945	15	21
40	55	8.204070	11.795930	8.204126	11.795874	10.000056	9.999944	5	20
41	15	8.206040	11.793960	8.206096	11.793904	10.000056	9.999944	45	19
42	30	8.208000	11.792000	8.208057	11.791943	10.000057	9.999943	30	18
43	45	8.209952	11.790048	8.210009	11.789991	10.000057	9.999943	15	17
44	56	8.211895	11.788105	8.211953	11.788047	10.000058	9.999942	4	16
45	15	8.213829	11.786171	8.213887	11.786113	10.000058	9.999942	45	15
46	30	8.215755	11.784245	8.215814	11.784186	10.000059	9.999941	30	14
47	45	8.217672	11.782328	8.217731	11.782269	10.000059	9.999941	15	13
48	57	8.219581	11.780419	8.219641	11.780359	10.000060	9.999940	3	12
49	15	8.221481	11.778519	8.221542	11.778458	10.000060	9.999940	45	11
50	30	8.223374	11.776626	8.223434	11.776565	10.000061	9.999939	30	10
51	45	8.225258	11.774742	8.225319	11.774681	10.000061	9.999939	15	9
52	58	8.227133	11.772867	8.227195	11.772805	10.000062	9.999938	2	8
53	15	8.229001	11.770999	8.229064	11.770936	10.000062	9.999938	45	7
54	30	8.230861	11.769139	8.230924	11.769076	10.000063	9.999937	30	6
55	45	8.232713	11.767287	8.232776	11.767224	10.000063	9.999937	15	5
56	59	8.234557	11.765443	8.234621	11.765379	10.000064	9.999936	1	4
57	15	8.236393	11.763607	8.236457	11.763542	10.000065	9.999935	45	3
58	30	8.238221	11.761779	8.238286	11.761713	10.000065	9.999935	30	2
59	45	8.240042	11.759958	8.240108	11.759892	10.000066	9.999934	15	1
60	60	8.241855	11.758145	8.241921	11.758078	10.000066	9.999934	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$5^h\ 56^m$		LOG SINES, &c.				89 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	$0^h\ 4^m$.		LOG. SINES, &c.					1 deg.	
0	0	8.241855	11.758145	8.241921	11.758079	10.000066	9.999934	60	60
1	15	8.243661	11.756339	8.243728	11.756272	10.000067	9.999933	45	59
2	30	8.245459	11.754541	8.245526	11.754474	10.000067	9.999933	30	58
3	45	8.247250	11.752750	8.247318	11.752682	10.000068	9.999932	15	57
4	1	8.249033	11.750967	8.249101	11.750899	10.000068	9.999932	59	56
5	15	8.250809	11.749191	8.250878	11.749122	10.000069	9.999931	45	55
6	30	8.252578	11.747422	8.252648	11.747352	10.000070	9.999930	30	54
7	45	8.254340	11.745660	8.254410	11.745590	10.000070	9.999930	15	53
8	2	8.256094	11.743906	8.256165	11.743835	10.000071	9.999929	58	52
9	15	8.257842	11.742158	8.257913	11.742087	10.000071	9.999929	45	51
10	30	8.259582	11.740418	8.259654	11.740346	10.000072	9.999928	30	50
11	45	8.261316	11.738684	8.261388	11.738612	10.000072	9.999928	15	49
12	3	8.263042	11.736958	8.263115	11.736885	10.000073	9.999927	57	48
13	15	8.264762	11.735238	8.264836	11.735164	10.000074	9.999926	45	47
14	30	8.266475	11.733525	8.266549	11.733451	10.000074	9.999926	30	46
15	45	8.268181	11.731819	8.268256	11.731744	10.000075	9.999925	15	45
16	4	8.269881	11.730119	8.269956	11.730044	10.000075	9.999925	56	44
17	15	8.271574	11.728426	8.271650	11.728350	10.000076	9.999924	45	43
18	30	8.273260	11.726740	8.273337	11.726663	10.000076	9.999924	30	42
19	45	8.274940	11.725060	8.275017	11.724983	10.000077	9.999923	15	41
20	5	8.276614	11.723386	8.276691	11.723309	10.000078	9.999922	55	40
21	15	8.278281	11.721719	8.278359	11.721641	10.000078	9.999922	45	39
22	30	8.279941	11.720059	8.280020	11.719980	10.000079	9.999921	30	38
23	45	8.281595	11.718405	8.281675	11.718325	10.000080	9.999921	15	37
24	6	8.283243	11.716757	8.283323	11.716677	10.000080	9.999920	54	36
25	15	8.284885	11.715115	8.284966	11.715034	10.000081	9.999919	45	35
26	30	8.286521	11.713479	8.286602	11.713398	10.000081	9.999919	30	34
27	45	8.288150	11.711850	8.288232	11.711768	10.000082	9.999918	15	33
28	7	8.289773	11.710227	8.289856	11.710144	10.000083	9.999917	53	32
29	15	8.291391	11.708609	8.291474	11.708526	10.000083	9.999917	45	31
30	30	8.293002	11.706998	8.293086	11.706914	10.000084	9.999916	30	30
31	45	8.294607	11.705393	8.294692	11.705308	10.000084	9.999916	15	29
32	8	8.296207	11.703793	8.296292	11.703708	10.000085	9.999915	52	28
33	15	8.297800	11.702200	8.297886	11.702114	10.000086	9.999914	45	27
34	30	8.299388	11.700612	8.299474	11.700526	10.000086	9.999914	30	26
35	45	8.300970	11.699030	8.301057	11.698943	10.000087	9.999913	15	25
36	9	8.302546	11.697454	8.302633	11.697367	10.000088	9.999912	51	24
37	15	8.304116	11.695884	8.304205	11.695795	10.000088	9.999912	45	23
38	30	8.305681	11.694319	8.305770	11.694230	10.000089	9.999911	30	22
39	45	8.307240	11.692760	8.307330	11.692670	10.000090	9.999911	15	21
40	10	8.308794	11.691206	8.308884	11.691116	10.000090	9.999910	50	20
41	15	8.310342	11.689658	8.310433	11.689567	10.000091	9.999909	45	19
42	30	8.311885	11.688115	8.311976	11.688024	10.000091	9.999909	30	18
43	45	8.313422	11.686578	8.313514	11.686486	10.000092	9.999908	15	17
44	11	8.314954	11.685046	8.315046	11.684954	10.000093	9.999907	49	16
45	15	8.316480	11.683520	8.316573	11.683427	10.000093	9.999907	45	15
46	30	8.318001	11.681999	8.318095	11.681905	10.000094	9.999906	30	14
47	45	8.319516	11.680484	8.319611	11.680389	10.000095	9.999905	15	13
48	12	8.321027	11.678973	8.321122	11.678878	10.000095	9.999905	48	12
49	15	8.322532	11.677468	8.322628	11.677372	10.000096	9.999904	45	11
50	30	8.324032	11.675968	8.324128	11.675872	10.000097	9.999903	30	10
51	45	8.325527	11.674473	8.325624	11.674376	10.000097	9.999903	15	9
52	13	8.327016	11.672984	8.327114	11.672886	10.000098	9.999902	47	8
53	15	8.328501	11.671499	8.328599	11.671400	10.000099	9.999901	45	7
54	30	8.329980	11.670020	8.330080	11.669920	10.000099	9.999901	30	6
55	45	8.331455	11.668545	8.331555	11.668445	10.000100	9.999900	15	5
56	14	8.332924	11.667076	8.333025	11.666975	10.000101	9.999899	46	4
57	15	8.334389	11.665611	8.334490	11.665510	10.000101	9.999899	45	3
58	30	8.335848	11.664152	8.335950	11.664050	10.000102	9.999898	30	2
59	45	8.337303	11.662697	8.337406	11.662594	10.000103	9.999897	15	1
60	15	8.338753	11.661247	8.338856	11.661144	10.00010 -	9.999897	45	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$5^h\ 55^m$		LOG. SINES, &c.					88 deg.	

0h 5m.			LOG. SINES, &c.			1 deg.			
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	′	sec.
0	15	8.338753	11.661247	8.338856	11.661144	10.000103	9.999897	45	60
1	15	8.340198	11.659802	8.340302	11.659698	10.000104	9.999896	45	59
2	30	8.341638	11.658362	8.341743	11.658257	10.000105	9.999895	30	58
3	45	8.343074	11.656926	8.343179	11.656821	10 000105	9.999895	15	57
4	16	8 344504	11.655496	8.344610	11.655390	10.000106	9.999894	44	56
5	15	8.345930	11.654070	8.346037	11.653963	10.000107	9.999893	45	55
6	30	8.347352	11.652648	8.347459	11.652541	10.000108	9.999892	30	54
7	45	8.348768	11.651232	8.348877	11.651123	10.000108	9.999892	15	53
8	17	8.350180	11.649820	8.350289	11.649711	10.000109	9.999891	43	52
9	15	8.351588	11.648412	8.351698	11.648302	10.000110	9.999890	45	51
10	30	8.352991	11.647009	8.353101	11.646899	10.000110	9.999890	30	50
11	45	8.354389	11.645611	8.354501	11.645499	10.000111	9.999889	15	49
12	18	8.365783	11.644217	8.355895	11.644105	10.000112	9.999888	42	48
13	15	8.357173	11.642827	8.357285	11.642715	10.000113	9.999887	45	47
14	30	8.358558	11.641442	8.358671	11.641329	10.000113	9.999887	30	46
15	45	8.359939	11.640061	8.360053	11.639947	10.000114	9.999886	15	45
16	19	8.361315	11.638685	8.361430	11.638570	10.000115	9.999885	41	44
17	15	8.362687	11.637313	8.362802	11.637198	10.000115	9.999885	45	43
18	30	8.364054	11.635946	8.364171	11.635829	10.000116	9.999884	30	42
19	45	8.365418	11.634582	8.365535	11.634465	10.000117	9.999883	15	41
20	20	8.366777	11.633223	8.366894	11.633106	10.000118	9.999882	40	40
21	15	8.368132	11.631868	8.368250	11 631750	10.000118	9.999882	45	39
22	30	8.369482	11.630518	8.369601	11.630399	10.000119	9.999881	30	38
23	45	8.370829	11.629171	8.370948	11.629052	10.000120	9.999880	15	37
24	21	8.372171	11.627829	8.372291	11.627709	10.000121	9.999879	39	36
25	15	8.373509	11.626491	8.373630	11.626370	10.000121	9.999879	45	35
26	30	8.374843	11.625157	8.374965	11.625035	10.000122	9.999878	30	34
27	45	8.376173	11.623827	8.376296	11 623704	10.000123	9.999877	15	33
28	22	8.377499	11.622501	8.377622	11.622378	10.000124	9.999876	38	32
29	15	8.378821	11.621179	8.378945	11.621055	10.000124	9.999876	45	31
30	30	8.380138	11.619862	8.380263	11.619737	10.000125	9 999875	30	30
31	45	8.381452	11.618548	8.381578	11.618422	10.000126	9.999874	15	29
32	23	8.382762	11.617238	8.382889	11.617111	10.000127	9.999873	37	28
33	15	8.384068	11.615932	8.384195	11.615805	10.000127	9.999873	45	27
34	30	8.385370	11.614630	8.385498	11.614502	10.000128	9.999872	30	26
35	45	8.386668	11.613332	8.386797	11.613203	10.000129	9.999871	15	25
36	24	8.387962	11.612038	8.388092	11.611908	10.000130	9.999870	36	24
37	15	8.389253	11.610747	8.389383	11.610617	10.000130	9.999870	45	23
38	30	8.390539	11.609461	8.390670	11.609330	10.000131	9.999869	30	22
39	45	8.391822	11.608178	8.391954	11.608046	10.000132	9.999868	15	21
40	25	8.393101	11.606899	8.393234	11.606766	10.000133	9.999867	35	20
41	15	8.394376	11.605624	8.394509	11.605491	10.000134	9.999866	45	19
42	30	8.395647	11.604353	8.395782	11.604218	10.000134	9.999866	30	18
43	45	8.396915	11.603085	8.397050	11.602950	10.000135	9.999865	15	17
44	26	8.398179	11.601821	8.398315	11.601685	10.000136	9.999864	34	16
45	15	8.399440	11.600560	8.399576	11.600424	10.000137	9.999863	45	15
46	30	8.400696	11.599304	8.400834	11.599166	10.000138	9.999862	30	14
47	45	8.401949	11.598051	8.402088	11.597912	10.000138	9.999862	15	13
48	27	8.403199	11.596801	8.403338	11.596662	10.000139	9.999861	33	12
49	15	8.404445	11.595555	8.404585	11.595415	10.000140	9.999860	45	11
50	30	8.405687	11.594313	8.405828	11.594172	10.000141	9.999859	30	10
51	45	8.406926	11.593074	8.407068	11.592932	10.000142	9.999858	15	9
52	28	8.408161	11.591839	8.408304	11.591696	10.000142	9.999858	32	8
53	15	8.409393	11.590607	8.409536	11.590464	10.000143	9.999857	45	7
54	30	8.410621	11.589379	8.410765	11.589235	10.000144	9.999856	30	6
55	45	8.411846	11.588154	8.411991	11.588009	10.000145	9.999855	15	5
56	29	8.413068	11.586932	8 413213	11.586787	10.000146	9.999854	31	4
57	15	8.414286	11.585714	8.414432	11.585568	10.000146	9.999854	45	3
58	30	8.415500	11.584500	8 415647	11.584353	10.000147	9.999853	30	2
59	45	8.416711	11.583289	8.416859	11.583141	10.000148	9.999852	15	1
60	30	8.417919	11.582081	8.418068	11.581932	10.000149	9.999851	30	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
5h 54m.			LOG. SINES, &c.					88 deg.	

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	$0^h\ 6^m$.		LOG. SINES, &c.					1 deg.	
0	30	8.417919	11.582081	8.418068	11.581932	10.000149	9.999851	30	60
1	15	8.419123	11.580877	8.419273	11.580727	10.000150	9.999850	45	59
2	30	8.420324	11.579676	8.420475	11.579525	10.000151	9.999849	30	58
3	45	8.421522	11.578478	8.421674	11.578326	10.000151	9.999849	15	57
4	31	8.422717	11.577283	8.422869	11.577131	10.000152	9.999848	29	56
5	15	8.423908	11.576092	8.424061	11.575939	10.000153	9.999847	45	55
6	30	8.425096	11.574904	8.425250	11.574750	10.000154	9.999846	30	54
7	45	8.426281	11.573719	8.426435	11.573565	10.000155	9.999845	15	53
8	32	8.427462	11.572538	8.427618	11.572382	10.000156	9.999844	28	52
9	15	8.428640	11.571360	8.428797	11.571203	10.000156	9.999844	45	51
10	30	8.429815	11.570185	8.429973	11.570027	10.000157	9.999843	30	50
11	45	8.430987	11.569013	8.431145	11.568855	10.000158	9.999842	15	49
12	33	8.432156	11.567844	8.432315	11.567685	10.000159	9.999841	27	48
13	15	8.433322	11.566678	8.433481	11.566519	10.000160	9.999840	45	47
14	30	8.434484	11.565516	8.434645	11.565355	10.000161	9.999839	30	46
15	45	8.435644	11.564356	8.435805	11.564195	10.000162	9.999838	15	45
16	34	8.436800	11.563200	8.436962	11.563038	10.000162	9.999838	26	44
17	15	8.437953	11.562047	8.438116	11.561884	10.000163	9.999837	45	43
18	30	8.439103	11.560897	8.439267	11.560733	10.000164	9.999836	30	42
19	45	8.440250	11.559750	8.440415	11.559585	10.000165	9.999835	15	41
20	35	8.441394	11.558606	8.441560	11.558440	10.000166	9.999834	25	40
21	15	8.442535	11.557465	8.442702	11.557298	10.000167	9.999833	45	39
22	30	8.443674	11.556326	8.443841	11.556159	10.000168	9.999832	30	38
23	45	8.444809	11.555191	8.444977	11.555023	10.000169	9.999831	15	37
24	36	8.445941	11.554059	8.446110	11.553890	10.000169	9.999831	24	36
25	15	8.447070	11.552930	8.447240	11.552760	10.000170	9.999830	45	35
26	30	8.448196	11.551804	8.448367	11.551633	10.000171	9.999829	30	34
27	45	8.449320	11.550680	8.449492	11.550508	10.000172	9.999828	15	33
28	37	8.450440	11.549560	8.450613	11.549387	10.000173	9.999827	23	32
29	15	8.451558	11.548442	8.451732	11.548268	10.000174	9.999826	45	31
30	30	8.452672	11.547328	8.452847	11.547153	10.000175	9.999825	30	30
31	45	8.453784	11.546216	8.453960	11.546040	10.000176	9.999824	15	29
32	38	8.454893	11.545107	8.455070	11.544930	10.000177	9.999823	22	28
33	15	8.456000	11.544000	8.456177	11.543823	10.000177	9.999823	45	27
34	30	8.457103	11.542897	8.457281	11.542719	10.000178	9.999822	30	26
35	45	8.458203	11.541797	8.458383	11.541617	10.000179	9.999821	15	25
36	39	8.459301	11.540699	8.459481	11.540519	10.000180	9.999820	21	24
37	15	8.460396	11.539604	8.460577	11.539423	10.000181	9.999819	45	23
38	30	8.461489	11.538511	8.461670	11.538330	10.000182	9.999818	30	22
39	45	8.462578	11.537422	8.462761	11.537239	10.000183	9.999817	15	21
40	40	8.463665	11.536335	8.463849	11.536151	10.000184	9.999816	20	20
41	15	8.464749	11.535251	8.464934	11.535066	10.000185	9.999815	45	19
42	30	8.465830	11.534170	8.466016	11.533984	10.000186	9.999814	30	18
43	45	8.466909	11.533091	8.467095	11.532905	10.000187	9.999813	15	17
44	41	8.467985	11.532015	8.468172	11.531828	10.000188	9.999812	19	16
45	15	8.469058	11.530942	8.469247	11.530753	10.000188	9.999812	45	15
46	30	8.470129	11.529871	8.470318	11.529682	10.000189	9.999811	30	14
47	45	8.471197	11.528803	8.471387	11.528613	10.000190	9.999810	15	13
48	42	8.472263	11.527737	8.472454	11.527546	10.000191	9.999809	18	12
49	15	8.473325	11.526675	8.473517	11.526483	10.000192	9.999808	45	11
50	30	8.474386	11.525614	8.474579	11.525421	10.000193	9.999807	30	10
51	45	8.475443	11.524557	8.475637	11.524363	10.000194	9.999806	15	9
52	43	8.476498	11.523502	8.476693	11.523307	10.000195	9.999805	17	8
53	15	8.477551	11.522449	8.477747	11.522253	10.000196	9.999804	45	7
54	30	8.478601	11.521399	8.478798	11.521202	10.000197	9.999803	30	6
55	45	8.479648	11.520352	8.479846	11.520154	10.000198	9.999802	15	5
56	44	8.480693	11.519307	8.480892	11.519108	10.000199	9.999801	16	4
57	15	8.481736	11.518264	8.481935	11.518065	10.000200	9.999800	45	3
58	30	8.482775	11.517225	8.482976	11.517024	10.000201	9.999799	30	2
59	45	8.483813	11.516187	8.484015	11.515985	10.000202	9.999798	15	1
60	45	8.484848	11.515152	8.485050	11.514950	10.000203	9.999797	15	
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$5^h\ 53^m$.		LOG. SINES, &c.					88 deg.	

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	′ ″	sec.
	$0^h\ 7^m$.		LOG. SINES, &c.				1 deg.		
0	45	8.484848	11.515152	8.485050	11.514950	10.000203	9.999797	15	60
1	15	8.485880	11.514120	8.486084	11 513916	10.000204	9.999796	45	59
2	30	8.486910	11.513090	8.487115	11.512885	10.000205	9.999795	30	58
3	45	8.487938	11.512062	8.488143	11.511857	10.000206	9.999794	15	57
4	46	8.488963	11.511037	8.489170	11.510830	10.000207	9.999793	14	56
5	15	8.489986	11.510014	8.490193	11.509807	10.000208	9.999792	45	55
6	30	8.491006	11.508994	8.491215	11.508785	10.000208	9.999792	30	54
7	45	8.492024	11.507976	8.492234	11.507766	10.000209	9.999791	15	53
8	47	8.493040	11.506960	8.493250	11.506750	10.000210	9.999790	13	52
9	15	8.494053	11.505947	8.494264	11.505736	10.000211	9.999789	45	51
10	30	8.495064	11.504936	8.495276	11.504724	10.000212	9.999788	30	50
11	45	8.496072	11.503928	8.496286	11.503714	10.000213	9.999787	15	49
12	48	8.497078	11.502922	8.497293	11.502707	10 000214	9.999786	12	48
13	15	8.498082	11.501918	8.498298	11.501702	10.000215	9.999785	45	47
14	30	8.499084	11.500916	8.499300	11.500700	10.000216	9.999784	30	46
15	45	8.500083	11.499917	8.500300	11.499700	10.000217	9.999783	15	45
16	49	8.501080	11.493920	8.501298	11.498702	10.000218	9.999782	11	44
17	15	8.502074	11.497926	8.502294	11.497706	10.000219	9.999781	45	43
18	30	8.503067	11.496933	8.503287	11.496713	10.000220	9.999780	30	42
19	45	8.504057	11.495943	8.504278	11.495722	10.000221	9.999779	15	41
20	50	8.505045	11.494955	8.505267	11.494733	10.000222	9.999778	10	40
21	15	8.506030	11.493970	8.506254	11.493746	10.000223	9.999777	45	39
22	30	8.507014	11.492986	8.507238	11.492762	10.000224	9.999776	30	38
23	45	8.507995	11.492005	8.508220	11.491780	10.000225	9.999775	15	37
24	51	8.508974	11.491026	8.509200	11.490800	10.000226	9.999774	9	36
25	15	8.509950	11.490050	8.510178	11.489822	10.000227	9.999773	45	35
26	30	8.510925	11.489075	8.511153	11.488847	10.000229	9.999771	30	34
27	45	8.511897	11.488103	8.512127	11.487873	10.000230	9.999770	15	33
28	52	8.512867	11.487133	8.513098	11.486902	10.000231	9.999769	8	32
29	15	8.513835	11.486165	8.514067	11.485933	10.000232	9.999768	45	31
30	30	8.514801	11.485199	8.515034	11.484966	10.000233	9.999767	30	30
31	45	8.515765	11.484235	8.515998	11.484002	10.000234	9.999766	15	29
32	53	8.516726	11.483274	8.516961	11.483039	10.000235	9.999765	7	28
33	15	8.517686	11.482314	8.517921	11 482079	10.000236	9.999764	45	27
34	30	8.518643	11.481357	8.518880	11.481120	10.000237	9.999763	30	26
35	45	8.519598	11.480402	8.519836	11.480164	10.000238	9.999762	15	25
36	54	8.520551	11.479449	8.520790	11.479210	10.000239	9.999761	6	24
37	15	8.521502	11.478498	8.521742	11.478258	10.000240	9.999760	45	23
38	30	8.522451	11.477549	8.522692	11.477308	10.000241	9.999759	30	22
39	45	8.523398	11.476602	8.523640	11.476360	10.000242	9.999758	15	21
40	55	8.524343	11.475657	8.524586	11.475414	10.000243	9.999757	5	20
41	15	8.525286	11.474714	8.525530	11.474470	10.000244	9.999756	45	19
42	30	8.526226	11.473774	8.526472	11.473528	10.000245	9.999755	30	18
43	45	8.527165	11.472835	8.527411	11.472589	10.000246	9.999754	15	17
44	56	8.528102	11.471898	8.528349	11.471651	10.000247	9.999753	4	16
45	15	8.529036	11.470964	8.529285	11.470715	10.000248	9.999752	45	15
46	30	8.529969	11.470031	8.530218	11.469782	10.000249	9.999751	30	14
47	45	8.530899	11.469101	8.531150	11.468850	10.000251	9.999749	15	13
48	57	8.531828	11.468172	8.532080	11.467920	10.000252	9.999748	3	12
49	15	8.532755	11.467245	8.533007	11.466993	10.000253	9.999747	45	11
50	30	8.533679	11.466321	8.533933	11.466067	10.000254	9.999746	30	10
51	45	8.534602	11.465398	8.534857	11.465143	10.000255	9.999745	15	9
52	58	8.535523	11.464477	8.535779	11.464221	10.000256	9.999744	2	8
53	15	8.536442	11.463558	8.536699	11.463301	10.000257	9.999743	45	7
54	30	8.537358	11.462642	8.537616	11.462384	10.000258	9.999742	30	6
55	45	8.538273	11.461727	8.538532	11.461468	10.000259	9.999741	15	5
56	59	8.539186	11.460814	8.539447	11.460553	10.000260	9.999740	1	4
57	15	8.540097	11.459903	8.540359	11.459641	10.000261	9.999739	45	3
58	30	8.541007	11.458993	8.541269	11.458731	10.000262	9.999738	30	2
59	45	8.541914	11.458086	8.542177	11.457823	10.000264	9.999736	15	1
60	60	8.542819	11.457181	8.543084	11.456916	10.000265	9.999735	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	′ ″	sec.
	$5^h\ 52^m$.		LOG SINES, &c.				88 deg.		

0h 8m.				LOG. SINES, &c.			2 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	0	8.542819	11.457181	8.543084	11.456916	10.000265	9.999735	60	60
1	15	8.543723	11.456277	8.543988	11.456012	10.000266	9.999734	45	59
2	30	8.544624	11.455376	8.544891	11.455109	10.000267	9.999733	30	58
3	45	8.545524	11.454476	8.545792	11.454208	10.000268	9.999732	15	57
4	1	8.546422	11.453578	8.546691	11.453309	10.000269	9.999731	59	56
5	15	8.547318	11.452682	8.547588	11.452412	10.000270	9.999730	45	55
6	30	8.548212	11.451788	8.548483	11.451517	10.000271	9.999729	30	54
7	45	8.549104	11.450896	8.549377	11.450623	10.000272	9.999728	15	53
8	2	8.549995	11.450005	8.550268	11.449732	10.000274	9.999726	58	52
9	15	8.550883	11.449117	8.551158	11.448842	10.000275	9.999725	45	51
10	30	8.551770	11.448230	8.552046	11.447954	10.000276	9.999724	30	50
11	45	8.552655	11.447345	8.552932	11.447068	10.000277	9.999723	15	49
12	3	8.553539	11.446461	8.553817	11.446183	10.000278	9.999722	57	48
13	15	8.554420	11.445580	8.554699	11.445301	10.000279	9.999721	45	47
14	30	8.555300	11.444700	8.555580	11.444420	10.000280	9.999720	30	46
15	45	8.556177	11.443823	8.556459	11.443541	10.000281	9.999719	15	45
16	4	8.557054	11.442946	8.557336	11.442664	10.000283	9.999717	56	44
17	15	8.557928	11.442072	8.558212	11.441788	10.000284	9.999716	45	43
18	30	8.558800	11.441200	8.559085	11.440915	10.000285	9.999715	30	42
19	45	8.559671	11.440329	8.559957	11.440043	10.000286	9.999714	15	41
20	5	8.560540	11.439460	8.560828	11.439172	10.000287	9.999713	55	40
21	15	8.561408	11.438592	8.561696	11.438304	10.000288	9.999712	45	39
22	30	8.562273	11.437727	8.562563	11.437437	10.000290	9.999710	30	38
23	45	8.563137	11.436863	8.563428	11.436572	10.000291	9.999709	15	37
24	6	8.563999	11.436001	8.564291	11.435709	10.000292	9.999708	54	36
25	15	8.564860	11.435140	8.565153	11.434847	10.000293	9.999707	45	35
26	30	8.565719	11.434281	8.566013	11.433987	10.000294	9.999706	30	34
27	45	8.566576	11.433424	8.566871	11.433129	10.000295	9.999705	15	33
28	7	8.567431	11.432569	8.567727	11.432273	10.000296	9.999704	53	32
29	15	8.568285	11.431715	8.568582	11.431418	10.000298	9.999702	45	31
30	30	8.569137	11.430863	8.569435	11.430565	10.000299	9.999701	30	30
31	45	8.569987	11.430013	8.570287	11.429713	10.000300	9.999700	15	29
32	8	8.570836	11.429164	8.571137	11.428863	10.000301	9.999699	52	28
33	15	8.571683	11.428317	8.571985	11.428015	10.000302	9.999698	45	27
34	30	8.572528	11.427472	8.572832	11.427168	10.000304	9.999696	30	26
35	45	8.573372	11.426628	8.573676	11.426324	10.000305	9.999695	15	25
36	9	8.574214	11.425786	8.574520	11.425480	10.000306	9.999694	51	24
37	15	8.575054	11.424946	8.575361	11.424639	10.000307	9.999693	45	23
38	30	8.575893	11.424107	8.576201	11.423799	10.000308	9.999692	30	22
39	45	8.576730	11.423270	8.577040	11.422960	10.000309	9.999691	15	21
40	10	8.577566	11.422434	8.577877	11.422123	10.000311	9.999689	50	20
41	15	8.578400	11.421600	8.578712	11.421288	10.000312	9.999688	45	19
42	30	8.579232	11.420768	8.579545	11.420455	10.000313	9.999687	30	18
43	45	8.580063	11.419937	8.580377	11.419623	10.000314	9.999686	15	17
44	11	8.580892	11.419108	8.581208	11.418792	10.000315	9.999685	49	16
45	15	8.581720	11.418280	8.582036	11.417964	10.000317	9.999683	45	15
46	30	8.582546	11.417454	8.582864	11.417136	10.000318	9.999682	30	14
47	45	8.583370	11.416630	8.583689	11.416311	10.000319	9.999681	15	13
48	12	8.584193	11.415807	8.584514	11.415486	10.000320	9.999680	48	12
49	15	8.585015	11.414985	8.585336	11.414664	10.000321	9.999679	45	11
50	30	8.585834	11.414166	8.586157	11.413843	10.000323	9.999677	30	10
51	45	8.586653	11.413347	8.586977	11.413023	10.000324	9.999676	15	9
52	13	8.587469	11.412531	8.587794	11.412206	10.000325	9.999675	47	8
53	15	8.588285	11.411715	8.588611	11.411389	10.000326	9.999674	45	7
54	30	8.589098	11.410902	8.589426	11.410574	10.000328	9.999672	30	6
55	45	8.589910	11.410090	8.590239	11.409761	10.000329	9.999671	15	5
56	14	8.590721	11.409279	8.591051	11.408949	10.000330	9.999670	46	4
57	15	8.591530	11.408470	8.591861	11.408139	10.000331	9.999669	45	3
58	30	8.592338	11.407662	8.592670	11.407330	10.000333	9.999667	30	2
59	45	8.593144	11.406856	8.593477	11.406523	10.000334	9.999666	15	1
60	15	8.593948	11.406052	8.594283	11.405717	10.000335	9.999665	45	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
5h 51m.				LOG. SINES, &c.			87 deg.		

0h 9m. LOG. SINES, &c. 2 deg.

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	15	8.593948	11.406052	8.594283	11.405717	10.000335	9.999665	45	60
1	15	8.594751	11.405249	8.595087	11.404913	10.000336	9.999664	45	59
2	30	8.595553	11.404447	8.595890	11.404110	10.000337	9.999663	30	58
3	45	8.596353	11.403647	8.596692	11.403308	10.000339	9.999661	15	57
4	16	8.597152	11.402848	8.597492	11.402508	10.000340	9.999660	44	56
5	15	8.597949	11.402051	8.598290	11.401710	10.000341	9.999659	45	55
6	30	8.598745	11.401255	8.599087	11.400913	10.000342	9.999658	30	54
7	45	8.599539	11 400461	8.599883	11.400117	10.000344	9.999656	15	53
8	17	8.600332	11.399668	8.600677	11.399323	10.000345	9.999655	43	52
9	15	8.601123	11.398877	8.601469	11.398531	10.000346	9.999654	45	51
10	30	8.601913	11.398087	8.602260	11.397740	10.000348	9.999652	30	50
11	45	8.602701	11.397299	8.603050	11.396950	10.000349	9.999651	15	49
12	18	8.603489	11.396511	8.603839	11.396161	10.000350	9.999650	42	48
13	15	8.604274	11.395726	8.604625	11.395374	10.000351	9.999649	45	47
14	30	8.605058	11.394942	8.605411	11.394589	10.000353	9.999647	30	46
15	45	8.605841	11.394159	8.606195	11.393805	10.000354	9.999646	15	45
16	19	8.606623	11.393377	8.606978	11.393022	10.000355	9.999645	41	44
17	15	8.607403	11.392597	8.607759	11.392241	10.000356	9.999644	45	43
18	30	8.608181	11.391819	8.608539	11.391461	10.000358	9.999642	30	42
19	45	8.608958	11.391042	8.609317	11.390683	10.000359	9.999641	15	41
20	20	8.609734	11.390266	8.610094	11.389906	10.000360	9.999640	40	40
21	15	8.610508	11.389492	8.610870	11.389130	10.000362	9.999638	45	39
22	30	8.611281	11.388719	8.611644	11.388356	10.000363	9.999637	30	38
23	45	8.612053	11.387947	8.612417	11.387583	10.000364	9.999636	15	37
24	21	8.612823	11.387177	8.613189	11.386811	10.000365	9.999635	39	36
25	15	8.613592	11.386408	8.613959	11.386041	10.000367	9.999633	45	35
26	30	8.614360	11.385640	8.614728	11.385272	10.000368	9.999632	30	34
27	45	8.615126	11.384874	8.615495	11.384505	10.000369	9.999631	15	33
28	22	8.615891	11.384109	8.616262	11.383738	10.000371	9.999629	38	32
29	15	8.616654	11.383346	8.617026	11.382974	10.000372	9.999628	45	31
30	30	8.617417	11.382583	8.617790	11.382210	10.000373	9.999627	30	30
31	45	8.618177	11.381823	8.618552	11.381448	10.000375	9.999625	15	29
32	23	8.618937	11.381063	8.619313	11.380687	10.000376	9.999624	37	28
33	15	8.619695	11.380305	8.620072	11.379928	10.000377	9.999623	45	27
34	30	8.620452	11.379548	8.620830	11.379170	10.000379	9.999621	30	26
35	45	8.621207	11.378793	8.621587	11.378413	10.000380	9.999620	15	25
36	24	8.621962	11.378038	8.622343	11.377657	10.000381	9.999619	36	24
37	15	8.622714	11.377285	8.623097	11.376903	10.000382	9.999618	45	23
38	30	8.623466	11.376534	8.623850	11.376150	10.000384	9.999616	30	22
39	45	8.624216	11.375784	8.624601	11.375399	10.000385	9.999615	15	21
40	25	8.624965	11.375035	8.625352	11.374648	10.000386	9.999614	35	20
41	15	8.625713	11.374287	8.626101	11.373899	10.000388	9.999612	45	19
42	30	8.626459	11.373541	8.626848	11.373152	10.000389	9.999611	30	18
43	45	8.627205	11.372795	8.627595	11.372405	10.000390	9.999610	15	17
44	26	8 627948	11.372052	8.628340	11.371660	10.000392	9.999608	34	16
45	15	8.628691	11.371309	8.629084	11.370916	10.000393	9.999607	45	15
46	30	8.629432	11.370568	8.629827	11.370173	10.000395	9.999605	30	14
47	45	8.630172	11.369828	8.630568	11.369432	10.000396	9.999604	15	13
48	27	8.630911	11.369089	8.631308	11.368692	10.000397	9.999603	33	12
49	15	8.631649	11.368351	8.632047	11.367953	10.000399	9.999601	45	11
50	30	8.632385	11.367615	8.632785	11.367215	10.000400	9.999600	30	10
51	45	8.633120	11.366880	8.633521	11.366479	10.000401	9.999599	15	9
52	28	8.633854	11.366146	8.634256	11.365744	10.000403	9.999597	32	8
53	15	8.634586	11.365414	8.634990	11.365010	10.000404	9.999596	45	7
54	30	8.635317	11.364683	8.635723	11.364277	10.000405	9.999595	30	6
55	45	8.636048	11.363952	8.636454	11.363546	10.000407	9.999593	15	5
56	29	8.636776	11.363224	8.637184	11.362816	10.000408	9.999592	31	4
57	15	8.637504	11.362496	8.637913	11.362087	10.000409	9.999591	45	3
58	30	8.638230	11.361770	8.638641	11.361359	10.000411	9.999589	30	2
59	45	8.638956	11.361044	8.639368	11.360632	10.000412	9.999588	15	1
60	30	8.639680	11 360320	8.640093	11.359907	10.000414	9.999586	30	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.

5h 50m. LOG. SINES, &c. 87 deg.

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	$0^h\ 10^m$.		LOG. SINES, &c.				2 deg.		
0	30	8.639680	11.360320	8.640093	11.359907	10.000414	9.999586	30	60
1	15	8.640402	11.359598	8.640817	11.359183	10.000415	9.999585	45	59
2	30	8.641124	11.358876	8.641540	11.358460	10.000416	9.999584	30	58
3	45	8.641844	11.358156	8.642262	11.357738	10.000418	9.999582	15	57
4	31	8.642563	11 357437	8.642982	11.357018	10.000419	9.999581	29	56
5	15	8.643281	11.356719	8.643702	11.356298	10.000421	9.999579	45	55
6	30	8.643998	11.356002	8.644420	11.355580	10.000422	9.999578	30	54
7	45	8.644714	11.355286	8.645137	11.354863	10.000423	9.999577	15	53
8	32	8.645428	11.354572	8.645853	11.354147	10.000425	9.999575	28	52
9	15	8.646141	11.353859	8.646567	11.353433	10.000426	9.999574	45	51
10	30	8.646853	11.353147	8.647281	11.352719	10.000428	9.999572	30	50
11	45	8.647564	11.352436	8.647993	11.352007	10.000429	9.999571	15	49
12	33	8.648274	11.351726	8.648704	11.351296	10.000430	9.999570	27	48
13	15	8.648983	11.351017	8.649414	11.350586	10.000432	9.999568	45	47
14	30	8.649690	11.350310	8.650123	11.349877	10.000433	9.999567	30	46
15	45	8.650396	11.349604	8.650831	11.349169	10.000435	9.999565	15	45
16	34	8.651102	11.348898	8.651537	11.348463	10.000436	9.999564	26	44
17	15	8.651806	11.348194	8.652243	11.347757	10.000437	9.999563	45	43
18	30	8.652508	11.347492	8.652947	11.347053	10.000439	9.999561	30	42
19	45	8.653210	11.346790	8.653650	11.346350	10.000440	9.999560	15	41
20	35	8.653911	11.346089	8.654352	11.345648	10.000442	9.999558	25	40
21	15	8.654610	11.345390	8.655053	11.344947	10.000443	9.999557	45	39
22	30	8.655308	11.344692	8.655753	11.344247	10.000444	9.999556	30	38
23	45	8.656006	11.343994	8.656451	11.343549	10.000446	9.999554	15	37
24	36	8.656702	11.343298	8.657149	11.342851	10.000447	9.999553	24	36
25	15	8.657397	11.342603	8.657845	11.342155	10.000449	9.999551	45	35
26	30	8.658090	11.341910	8.658541	11.341459	10.000450	9.999550	30	34
27	45	8.658783	11.341217	8.659235	11.340765	10.000452	9.999548	15	33
28	37	8.659475	11.340525	8.659928	11.340072	10.000453	9.999547	23	32
29	15	8.660165	11.339835	8.660620	11.339380	10.000455	9.999545	45	31
30	30	8.660855	11.339145	8.661311	11.338689	10.000456	9.999544	30	30
31	45	8.661543	11.338457	8.662000	11.338000	10.000457	9.999543	15	29
32	38	8.662230	11.337770	8.662689	11.337311	10.000459	9.999541	22	28
33	15	8.662916	11.337084	8.663377	11.336623	10.000460	9.999540	45	27
34	30	8.663601	11.336399	8.664063	11.335937	10.000462	9.999538	30	26
35	45	8.664285	11.335715	8.664749	11.335251	10.000463	9.999537	15	25
36	39	8.664968	11.335032	8.665433	11.334567	10.000465	9.999535	21	24
37	15	8.665650	11.334350	8.666116	11.333884	10.000466	9.999534	45	23
38	30	8.666331	11.333669	8.666799	11.333201	10.000468	9.999532	30	22
39	45	8.667011	11.332989	8 667480	11.332520	10.000469	9.999531	15	21
40	40	8.667689	11.332311	8.668160	11.331840	10.000470	9.999530	20	20
41	15	8.668367	11.331633	8.668839	11.331161	10.000472	9.999528	45	19
42	30	8.669043	11.330957	8.669517	11 330483	10.000474	9.999526	30	18
43	45	8.669719	11.330281	8.670194	11.329806	10.000475	9.999525	15	17
44	41	8.670393	11.329607	8.670870	11.329130	10.000476	9.999524	19	16
45	15	8.671067	11.328933	8.671544	11.328456	10.000478	9.999522	45	15
46	30	8.671739	11.328261	8.672218	11.327782	10.000479	9.999521	30	14
47	45	8.672410	11.327590	8.672891	11.327109	10.000481	9.999519	15	13
48	42	8.673080	11.326920	8.673563	11.326437	10.000482	9.999518	18	12
49	15	8.673750	11.326250	8.674233	11.325767	10.000484	9.999516	45	11
50	30	8.674418	11.325582	8.674903	11.325097	10.000485	9.999515	30	10
51	45	8.675085	11.324915	8.675572	11.324428	10.000487	9.999513	15	9
52	43	8.675751	11.324249	8.676239	11.323761	10.000488	9.999512	17	8
53	15	8.676416	11.323584	8.676906	11.323094	10.000490	9.999510	45	7
54	30	8.677080	11.322920	8.677571	11.322429	10.000491	9.999509	30	6
55	45	8.677743	11.322257	8.678236	11.321764	10.000493	9.999507	15	5
56	44	8.678405	11.321595	8.678900	11.321100	10.000494	9.999506	16	4
57	15	8.679066	11.320934	8.679562	11.320438	10.000496	9.999504	45	3
58	30	8.679726	11.320274	8.680224	11.319776	10.000497	9.999503	30	2
59	45	8.680385	11.319615	8.680884	11.319116	10.000499	9.999501	15	1
60	45	8.681043	11.318957	8.681544	11.318456	10.000500	9.999500	15	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$5^h\ 49^m$		LOG. SINES, &c.				87 deg.		

0h 11m.			LOG. SINES, &c.				2 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	45	8.681043	11.318957	8.681544	11.318456	10.000500	9.999500	15	60
1	15	8.681700	11.318300	8.682202	11.317798	10.000502	9.999498	45	59
2	30	8.682356	11.317644	8.682860	11.317140	10.000504	9.999496	30	58
3	45	8.683011	11.316989	8.683516	11.316484	10.000505	9.999495	15	57
4	46	8.683665	11.316335	8.684172	11.315828	10.000507	9.999493	14	56
5	15	8.684318	11.315682	8.684826	11.315174	10.000508	9.999492	45	55
6	30	8.684971	11.315029	8.685480	11.314520	10.000510	9.999490	30	54
7	45	8.685622	11.314378	8.686133	11.313867	10.000511	9.999489	15	53
8	47	8.686272	11.313728	8.686784	11.313216	10.000513	9.999487	13	52
9	15	8.686921	11.313079	8.687435	11.312565	10.000514	9.999486	45	51
10	30	8.687569	11.312431	8.688085	11.311915	10.000516	9.999484	30	50
11	45	8.688216	11.311784	8.688733	11.311267	10.000517	9.999483	15	49
12	48	8.688862	11.311138	8.689381	11.310619	10.000519	9.999481	12	48
13	15	8.689508	11.310492	8.690028	11.309972	10.000520	9.999480	45	47
14	30	8.690152	11.309848	8.690674	11.309326	10.000522	9.999478	30	46
15	45	8.690795	11.309205	8.691319	11.308681	10.000523	9.999477	15	45
16	49	8.691438	11.308562	8.691963	11.308037	10.000525	9.999475	11	44
17	15	8.692079	11.307921	8.692606	11.307394	10.000527	9.999473	45	43
18	30	8.692720	11.307280	8.693248	11.306752	10.000528	9.999472	30	42
19	45	8.693359	11.306641	8.693889	11.306111	10.000530	9.999470	15	41
20	50	8.693998	11.306002	8.694529	11.305471	10.000531	9.999469	10	40
21	15	8.694636	11.305364	8.695168	11.304832	10.000533	9.999467	45	39
22	30	8.695272	11.304728	8.695807	11.304193	10.000534	9.999466	30	38
23	45	8.695908	11.304092	8.696444	11.303556	10.000536	9.999464	15	37
24	51	8.696543	11.303457	8.697081	11.302919	10.000538	9.999462	9	36
25	15	8.697177	11.302823	8.697716	11.302284	10.000539	9.999461	45	35
26	30	8.697810	11.302190	8.698351	11.301649	10.000541	9.999459	30	34
27	45	8.698442	11.301558	8.698984	11.301016	10.000542	9.999458	15	33
28	52	8.699073	11.300927	8.699617	11.300383	10.000544	9.999456	8	32
29	15	8.699704	11.300296	8.700249	11.299751	10.000545	9.999455	45	31
30	30	8.700333	11.299667	8.700880	11.299120	10.000547	9.999453	30	30
31	45	8.700961	11.299039	8.701510	11.298490	10.000549	9.999451	15	29
32	53	8.701589	11.298411	8.702139	11.297861	10.000550	9.999450	7	28
33	15	8.702215	11.297785	8.702767	11.297233	10.000552	9.999448	45	27
34	30	8.702841	11.297159	8.703395	11.296605	10.000553	9.999447	30	26
35	45	8.703466	11.296534	8.704021	11.295979	10.000555	9.999445	15	25
36	54	8.704090	11.295910	8.704646	11.295354	10.000557	9.999443	6	24
37	15	8.704713	11.295287	8.705271	11.294729	10.000558	9.999442	45	23
38	30	8.705335	11.294665	8.705895	11.294105	10.000560	9.999440	30	22
39	45	8.705956	11.294044	8.706518	11.293482	10.000561	9.999439	15	21
40	55	8.706577	11.293423	8.707139	11.292861	10.000563	9.999437	5	20
41	15	8.707196	11.292804	8.707761	11.292239	10.000565	9.999435	45	19
42	30	8.707815	11.292185	8.708381	11.291619	10.000566	9.999434	30	18
43	45	8.708432	11.291568	8.709000	11.291000	10.000568	9.999432	15	17
44	56	8.709049	11.290951	8.709618	11.290382	10.000569	9.999431	4	16
45	15	8.709665	11.290335	8.710236	11.289764	10.000571	9.999429	45	15
46	30	8.710280	11.289720	8.710853	11.289147	10.000573	9.999427	30	14
47	45	8.710894	11.289106	8.711468	11.288532	10.000574	9.999426	15	13
48	57	8.711507	11.288493	8.712083	11.287917	10.000576	9.999424	3	12
49	15	8.712120	11.287880	8.712697	11.287303	10.000578	9.999422	45	11
50	30	8.712731	11.287269	8.713311	11.286689	10.000579	9.999421	30	10
51	45	8.713342	11.286658	8.713923	11.286077	10.000581	9.999419	15	9
52	58	8.713952	11.286048	8.714534	11.285466	10.000582	9.999418	2	8
53	15	8.714561	11.285439	8.715145	11.284855	10.000584	9.999416	45	7
54	30	8.715169	11.284831	8.715755	11.284245	10.000586	9.999414	30	6
55	45	8.715776	11.284224	8.716364	11.283636	10.000587	9.999413	15	5
56	59	8.716383	11.283617	8.716972	11.283028	10.000589	9.999411	1	4
57	15	8.716988	11.283012	8.717579	11.282421	10.000591	9.999409	45	3
58	30	8.717593	11.282407	8.718185	11.281815	10.000592	9.999408	30	2
59	45	8.718197	11.281803	8.718791	11.281209	10.000594	9.999406	15	1
60	60	8.718800	11.281200	8.719396	11.280604	10.000596	9.999404	0	0
sec.	′ ″	cosine	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
5h 48m.			LOG. SINES, &c.				87 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	$0^h\ 12^m$.		LOG. SINES, &c.					3 deg.	
0	0	8.718800	11.281200	8.719396	11.280604	10.000596	9.999404	60	60
1	15	8.719402	11.280598	8.720000	11.280000	10.000597	9.999403	45	59
2	30	8.720004	11.279996	8.720603	11.279397	10.000599	9.999401	30	58
3	45	8.720604	11.279396	8.721205	11.278795	10.000601	9.999399	15	57
4	1	8.721204	11.278796	8.721806	11.278194	10.000602	9.999398	59	56
5	15	8.721803	11.278197	8.722407	11.277593	10.000604	9.999396	45	55
6	30	8.722401	11.277599	8.723006	11.276994	10.000606	9.999394	30	54
7	45	8.722998	11.277002	8.723605	11.276395	10.000607	9.999393	15	53
8	2	8.723595	11.276405	8.724203	11.275797	10.000609	9.999391	58	52
9	15	8.724190	11.275810	8.724801	11.275199	10.000611	9.999389	45	51
10	30	8.724785	11.275215	8.725397	11.274603	10.000612	9.999388	30	50
11	45	8.725379	11.274621	8.725993	11.274007	10.000614	9.999386	15	49
12	3	8.725972	11.274028	8.726588	11.273412	10.000616	9.999384	57	48
13	15	8.726564	11.273436	8.727182	11.272818	10.000617	9.999383	45	47
14	30	8.727156	11.272844	8.727775	11.272225	10.000619	9.999381	30	46
15	45	8.727747	11.272253	8.728367	11.271633	10.000621	9.999379	15	45
16	4	8.728337	11.271663	8.728959	11.271041	10.000622	9.999378	56	44
17	15	8.728926	11.271074	8.729550	11.270450	10.000624	9.999376	45	43
18	30	8.729514	11.270486	8.730140	11.269860	10.000626	9.999374	30	42
19	45	8.730101	11.269899	8.730729	11.269271	10.000628	9.999372	15	41
20	5	8.730688	11.269312	8.731317	11.268683	10.000629	9.999371	55	40
21	15	8.731274	11.268726	8.731905	11.268095	10.000631	9.999369	45	39
22	30	8.731859	11.268141	8.732492	11.267508	10.000633	9.999367	30	38
23	45	8.732444	11.267556	8.733078	11.266922	10.000634	9.999366	15	37
24	6	8.733027	11.266973	8.733663	11.266337	10.000636	9.999364	54	36
25	15	8.733610	11.266390	8.734248	11.265752	10.000638	9.999362	45	35
26	30	8.734192	11.265808	8.734831	11.265169	10.000639	9.999361	30	34
27	45	8.734773	11.265227	8.735414	11.264586	10.000641	9.999359	15	33
28	7	8.735353	11.264647	8.735996	11.264004	10.000643	9.999357	53	32
29	15	8.735933	11.264067	8.736578	11.263422	10.000645	9.999355	45	31
30	30	8.736512	11.263488	8.737158	11.262842	10.000646	9.999354	30	30
31	45	8.737090	11.262910	8.737738	11.262262	10.000648	9.999352	15	29
32	8	8.737667	11.262333	8.738317	11.261683	10.000650	9.999350	52	28
33	15	8.738244	11.261756	8.738895	11.261105	10.000652	9.999348	45	27
34	30	8.738820	11.261180	8.739473	11.260527	10.000653	9.999347	30	26
35	45	8.739395	11.260605	8.740050	11.259950	10.000655	9.999345	15	25
36	9	8.739969	11.260031	8.740626	11.259374	10.000657	9.999343	51	24
37	15	8.740543	11.259457	8.741201	11.258799	10.000658	9.999342	45	23
38	30	8.741115	11.258885	8.741775	11.258225	10.000660	9.999340	30	22
39	45	8.741687	11.258313	8.742349	11.257651	10.000662	9.999338	15	21
40	10	8.742259	11.257741	8.742922	11.257078	10.000664	9.999336	50	20
41	15	8.742829	11.257171	8.743494	11.256506	10.000665	9.999335	45	19
42	30	8.743399	11.256601	8.744066	11.255934	10.000667	9.999333	30	18
43	45	8.743968	11.256032	8.744637	11.255363	10.000669	9.999331	15	17
44	11	8.744536	11.255464	8.745207	11.254793	10.000671	9.999329	49	16
45	15	8.745103	11.254897	8.745776	11.254224	10.000672	9.999328	45	15
46	30	8.745670	11.254330	8.746344	11.253656	10.000674	9.999326	30	14
47	45	8.746236	11.253764	8.746912	11.253088	10.000676	9.999324	15	13
48	12	8.746801	11.253199	8.747479	11.252521	10.000678	9.999322	48	12
49	15	8.747366	11.252634	8.748045	11.251955	10.000680	9.999320	45	11
50	30	8.747930	11.252070	8.748611	11.251389	10.000681	9.999319	30	10
51	45	8.748493	11.251507	8.749176	11.250824	10.000683	9.999317	15	9
52	13	8.749055	11.250945	8.749740	11.250260	10.000685	9.999315	47	8
53	15	8.749617	11.250383	8.750303	11.249697	10.000687	9.999313	45	7
54	30	8.750178	11.249822	8.750866	11.249134	10.000688	9.999312	30	6
55	45	8.750738	11.249262	8.751428	11.248572	10.000690	9.999310	15	5
56	14	8.751297	11.248703	8.751989	11.248011	10.000692	9.999308	46	4
57	15	8.751856	11.248144	8.752550	11.247450	10.000694	9.999306	45	3
58	30	8.752414	11.247586	8.753109	11.246891	10.000696	9.999304	30	2
59	45	8.752971	11.247029	8.753668	11.246332	10.000697	9.999303	15	1
60	15	8.753528	11.246472	8.754227	11.245773	10.000699	9.999301	45	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$5^h\ 47^m$		LOG. SINES, &c.					86 deg.	

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″	sec.
	$0^h\ 13^m$.		LOG. SINES, &c.					3 deg.	
0	15	8 753528	11.246472	8.754227	11.245773	10.000699	9.999301	45	60
1	15	8.754084	11.245916	8.754784	11.245216	10.000701	9.999299	45	59
2	30	8.754639	11.245361	8.755341	11.244659	10.000703	9.999297	30	58
3	45	8.755193	11.244807	8.755898	11.244102	10.000704	9.999296	15	57
4	16	8.755747	11.244253	8.756453	11.243547	10.000706	9.999294	44	56
5	15	8.756300	11.243700	8.757008	11.242992	10.000708	9.999292	45	55
6	30	8.756852	11.243148	8.757562	11.242438	10.000710	9.999290	30	54
7	45	8.757404	11.242596	8.758115	11.241885	10.000712	9.999288	15	53
8	17	8.757955	11.242045	8.758668	11.241332	10.000714	9.999286	43	52
9	15	8.758505	11.241495	8.759220	11.240780	10.000715	9.999285	45	51
10	30	8.759054	11.240946	8.759771	11.240229	10.000717	9.999283	30	50
11	45	8.759603	11.240397	8.760322	11.239678	10.000719	9.999281	15	49
12	18	8.760151	11.239849	8.760872	11.239128	10.000721	9.999279	42	48
13	15	8.760699	11.239301	8.761421	11.238579	10.000723	9.999277	45	47
14	30	8.761245	11.238755	8.761970	11.238030	10.000724	9.999276	30	46
15	45	8.761791	11.238209	8.762517	11.237483	10.000726	9.999274	15	45
16	19	8.762337	11.237663	8.763065	11.236935	10.000728	9.999272	41	44
17	15	8.762881	11.237119	8.763611	11.236389	10.000730	9.999270	45	43
18	30	8.763425	11.236575	8.764157	11.235843	10.000732	9.999268	30	42
19	45	8.763968	11.236032	8.764702	11.235298	10.000734	9.999266	15	41
20	20	8.764511	11.235489	8.765246	11.234754	10.000735	9.999265	40	40
21	15	8.765053	11.234947	8.765790	11 234210	10.000737	9.999263	45	39
22	30	8.765594	11.234406	8.766333	11.233667	10.000739	9.999261	30	38
23	45	8.766135	11.233865	8.766876	11.233124	10.000741	9.999259	15	37
24	21	8.766675	11.233325	8.767417	11.232583	10.000743	9.999257	39	36
25	15	8.767214	11.232786	8.767958	11.232042	10.000745	9.999255	45	35
26	30	8.767752	11.232248	8.768499	11.231501	10.000747	9.999253	30	34
27	45	8.768290	11.231710	8.769039	11.230961	10.000748	9.999252	15	33
28	22	8.768827	11.231173	8.769578	11.230422	10.000750	9.999250	38	32
29	15	8.769364	11.230636	8 770116	11.229884	10.000752	9.999248	45	31
30	30	8.769900	11.230100	8.770654	11.229346	10.000754	9.999246	30	30
31	45	8.770435	11.229565	8.771191	11.228809	10.000756	9.999244	15	29
32	23	8.770970	11.229030	8.771727	11.228273	10.000758	9.999242	37	28
33	15	8.771504	11.228496	8.772263	11.227737	10.000760	9.999240	45	27
34	30	8.772037	11.227963	8.772798	11.227202	10.000761	9.999239	30	26
35	45	8.772569	11.227431	8.773333	11.226667	10.000763	9.999237	15	25
36	24	8.773101	11.226899	8.773866	11.226134	10.000765	9.999235	36	24
37	15	8.773633	11.226367	8.774400	11.225600	10.000767	9.999233	45	23
38	30	8.774163	11.225837	8.774932	11.225068	10.000769	9.999231	30	22
39	45	8.774693	11.225307	8.775464	11.224536	10.000771	9.999229	15	21
40	25	8 775223	11.224777	8.775995	11.224005	10.000773	9.999227	35	20
41	15	8.775751	11.224249	8.776526	11.223474	10.000775	9.999225	45	19
42	30	8.776279	11.223721	8.777056	11.222944	10.000776	9.999224	30	18
43	45	8.776807	11.223193	8.777585	11.222415	10.000778	9.999222	15	17
44	26	8.777333	11.222667	8.778114	11.221886	10.000780	9.999220	34	16
45	15	8.777859	11.222141	8.778642	11.221358	10.000782	9.999218	45	15
46	30	8.778385	11.221615	8.779169	11.220831	10.000784	9.999216	30	14
47	45	8.778910	11.221090	8.779696	11.220304	10.000786	9.999214	15	13
48	27	8.779434	11.220566	8.780222	11.219778	10.000788	9.999212	33	12
49	15	8.779958	11.220042	8.780747	11.219253	10.000790	9.999210	45	11
50	30	8.780480	11.219520	8.781272	11.218728	10.000792	9.999208	30	10
51	45	8.781003	11.218997	8.781796	11.218204	10.000794	9.999206	15	9
52	28	8.781524	11.218476	8.782320	11.217680	10.000795	9.999205	32	8
53	15	8.782045	11.217955	8.782843	11.217157	10.000797	9.999203	45	7
54	30	8.782566	11.217434	8.783365	11.216635	10.000799	9.999201	30	6
55	45	8.783086	11.216914	8.783887	11 216113	10.000801	9.999199	15	5
56	29	9.783605	11.216395	8.784408	11.215592	10.000803	9.999197	31	4
57	15	8.784123	11.215877	8.784928	11.215072	10.000805	9.999195	45	3
58	30	8.784641	11.215359	8.785448	11.214552	10.000807	9.999193	30	2
59	45	8.785159	11.214841	8.785967	11.214033	10.000809	9.999191	15	1
60	30	8.785675	11.214325	8.786486	11.213514	10.000811	9.999189	30	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$5^h\ 46^m$.		LOG. SINES, &c.					86 deg.	

	$0^h\ 14^m$.		LOG. SINES, &C.				3 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	30	8.785675	11.214325	8.786486	11.213514	10.000811	9.999189	30	60
1	15	8.786191	11.213809	8.787004	11.212996	10.000813	9.999187	45	59
2	30	8.786707	11.213293	8.787521	11.212479	10.000815	9.999185	30	58
3	45	8.787222	11.212778	8.788038	11.211962	10.000817	9.999183	15	57
4	31	8.787736	11.212264	8.788554	11.211446	10.000819	9.999181	29	56
5	15	8.788249	11.211751	8.789070	11.210930	10.000821	9.999179	45	55
6	30	8.788762	11.211238	8.789585	11.210415	10 000822	9.999178	30	54
7	45	8.789275	11.210725	8.790099	11.209901	10.000824	9.999176	15	53
8	32	8.789787	11.210213	8.790613	11.209387	10.000826	9.999174	28	52
9	15	8.790298	11.209702	8.791126	11.208874	10.000828	9 999172	45	51
10	30	8.790808	11.209192	8.791639	11.208361	10.000830	9.999170	30	50
11	45	8.791318	11.208682	8.792151	11.207849	10.000832	9.999168	15	49
12	33	8.791828	11.208172	8.792662	11.207338	10.000834	9.999166	27	48
13	15	8.792337	11.207663	8.793173	11.206827	10.000836	9.999164	45	47
14	30	8.792845	11.207155	8.793683	11.206317	10.000838	9.999162	30	46
15	45	8.793352	11.206648	8.794192	11.205808	10.000840	9.999160	15	45
16	34	8.793859	11.206141	8.794701	11.205299	10.000842	9.999158	26	44
17	15	8.794366	11.205634	8.795210	11.204790	10.000844	9.999156	45	43
18	30	8.794872	11.205128	8.795717	11.204283	10.000846	9.999154	30	42
19	45	8.795377	11.204623	8.796225	11.203775	10.000848	9.999152	15	41
20	35	8.795881	11.204119	8.796731	11.203269	10.000850	9.999150	25	40
21	15	8.796385	11.203615	8.797237	11.202763	10.000852	9.999148	45	39
22	30	8.796889	11.203111	8.797743	11.202257	10.000854	9.999146	30	38
23	45	8.797392	11.202608	8.798248	11.201752	10.000856	9.999144	15	37
24	36	8.797894	11.202106	8.798752	11.201248	10.000858	9.999142	24	36
25	15	8.798396	11.201604	8.799256	11.200744	10.000860	9.999140	45	35
26	30	8.798897	11.201103	8.799759	11.200241	10.000862	9.999138	30	34
27	45	8.799397	11.200603	8.800261	11.199739	10.000864	9.999136	15	33
28	37	8.799897	11.200103	8.800763	11.199237	10.000866	9.999134	23	32
29	15	8.800397	11.199603	8.801265	11.198735	10.000868	9.999132	45	31
30	30	8.800896	11.199104	8.801765	11.198235	10.000870	9.999130	30	30
31	45	8.801394	11.198606	8.802266	11.197734	10.000872	9.999128	15	29
32	38	8.801891	11.198109	8.802765	11.197235	10.000874	9.999126	22	28
33	15	8.802389	11.197611	8.803264	11.196736	10.000876	9.999124	45	27
34	30	8.802885	11.197115	8.803763	11.196237	10.000878	9.999122	30	26
35	45	8.803381	11.196619	8.804261	11.195739	10.000880	9.999120	15	25
36	39	8.803876	11.196124	8.804758	11.195242	10.000882	9.999118	21	24
37	15	8.804371	11.195629	8.805255	11.194745	10.000884	9.999116	45	23
38	30	8.804865	11.195135	8.805751	11.194249	10.000886	9.999114	30	22
39	45	8.805359	11.194641	8.806247	11.193753	10.000888	9.999112	15	21
40	40	8.805852	11.194148	8.806742	11.193258	10.000890	9.999110	20	20
41	15	8.806345	11.193655	8.807237	11.192763	10.000892	9.999108	45	19
42	30	8.806837	11.193163	8.807731	11.192269	10.000894	9.999106	30	18
43	45	8.807328	11.192672	8.808224	11.191776	10.000896	9.999104	15	17
44	41	8.807819	11.192181	8.808717	11.191283	10.000898	9.999102	19	16
45	15	8.808309	11.191691	8.809210	11.190790	10.000900	9.999100	45	15
46	30	8.808799	11.191201	8.809701	11.190299	10.000902	9.999098	30	14
47	45	8.809288	11.190712	8.810193	11.189807	10.000904	9.999096	15	13
48	42	8.809777	11.190223	8.810683	11.189317	10.000906	9.999094	18	12
49	15	8.810265	11.189735	8.811173	11.188827	10.000908	9.999092	45	11
50	30	8.810753	11.189247	8.811663	11.188337	10.000910	9.999090	30	10
51	45	8.811240	11.188760	8.812152	11.187848	10.000912	9.999088	15	9
52	43	8.811726	11.188274	8.812641	11.187359	10.000914	9.999086	17	8
53	15	8.812212	11.187788	8.813129	11.186871	10.000916	9.999084	45	7
54	30	8.812698	11.187302	8.813616	11.186384	10.000919	9.999081	30	6
55	45	8.813182	11.186818	8.814103	11.185897	10.000921	9.999079	15	5
56	44	8.813667	11.186333	8.814589	11.185411	10.000923	9.999077	16	4
57	15	8.814150	11.185850	8.815075	11.184925	10.000925	9.999075	45	3
58	30	8.814634	11.185366	8.815560	11.184440	10.000927	9.999073	30	2
59	45	8.815116	11.184884	8.816045	11.183955	10.000929	9.999071	15	1
60	45	8.815598	11.184402	8.816529	11.183471	10.000931	9.999069	15	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$5^h\ 45^m$.		LOG. SINES, &c.				86 deg.		

0h 15m.		LOG. SINES, &c.					3 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″	sec.
0	45	8.815598	11.184402	8.816529	11.183471	10.000931	9.999069	15	60
1	15	8.816080	11.183920	8.817013	11.182987	10.000933	9.999067	45	59
2	30	8.816561	11.183439	8.817496	11.182504	10.000935	9.999065	30	58
3	45	8.817042	11.182958	8.817979	11.182021	10.000937	9.999063	15	57
4	46	8.817522	11.182478	8.818461	11.181539	10.000939	9.999061	14	56
5	15	8.818001	11.181999	8.818942	11.181058	10.000941	9.999059	45	55
6	30	8.818480	11.181520	8.819423	11.180577	10.000943	9.999057	30	54
7	45	8.818958	11.181042	8.819904	11.180096	10.000945	9.999055	15	53
8	47	8.819436	11.180564	8.820384	11.179616	10.000948	9.999052	13	52
9	15	8.819914	11.180086	8.820863	11.179137	10.000950	9.999050	45	51
10	30	8.820390	11.179610	8.821342	11.178658	10.000952	9.999048	30	50
11	45	8.820867	11.179133	8.821820	11.178180	10.000954	9.999046	15	49
12	48	8.821342	11.178658	8.822298	11.177702	10.000956	9.999044	12	48
13	15	8.821818	11.178182	8.822776	11.177224	10.000958	9.999042	45	47
14	30	8.822292	11.177708	8.823253	11.176747	10.000960	9.999040	30	46
15	45	8.822767	11.177233	8.823729	11.176271	10.000962	9.999038	15	45
16	49	8.823240	11.176760	8.824205	11.175795	10.000964	9.999036	11	44
17	15	8.823713	11.176287	8.824680	11.175320	10.000966	9.999034	45	43
18	30	8.824186	11.175814	8.825155	11.174845	10.000969	9.999031	30	42
19	45	8.824658	11.175342	8.825629	11.174371	10.000971	9.999029	15	41
20	50	8.825130	11.174870	8 826103	11.173897	10.000973	9.999027	10	40
21	15	8.825601	11.174399	8.826576	11.173424	10.000975	9.999025	45	39
22	30	8.826072	11.173928	8.827048	11.172952	10.000977	9.999023	30	38
23	45	8.826542	11.173458	8.827521	11.172479	10.000979	9.999021	15	37
24	51	8.827011	11.172989	8.827992	11.172008	10.000981	9.999019	9	36
25	15	8.827480	11.172520	8.828464	11.171536	10.000983	9.999017	45	35
26	30	8.827949	11.172051	8.828934	11.171066	10.000986	9.999014	30	34
27	45	8.828417	11.171583	8.829404	11.170596	10.000988	9.999012	15	33
28	52	8.828884	11.171116	8.829874	11.170126	10.000990	9.999010	8	32
29	15	8.829351	11.170649	8.830343	11.169657	10.000992	9.999008	45	31
30	30	8.829818	11.170182	8.830812	11.169188	10.000994	9.999006	30	30
31	45	8.830284	11.169716	8.831280	11.168720	10.000996	9.999004	15	29
32	53	8.830749	11.169251	8.831748	11.168252	10.000998	9.999002	7	28
33	15	8.831214	11.168786	8.832215	11.167785	10.001000	9.999000	45	27
34	30	8.831679	11.168321	8.832682	11.167318	10.001003	9.998997	30	26
35	45	8.832143	11.167857	8.833148	11.166852	10.001005	9.998995	15	25
36	54	8.832607	11.167393	8.833613	11.166387	10.001007	9.998993	6	24
37	15	8.833070	11.166930	8.834079	11.165921	10.001009	9.998991	45	23
38	30	8.833532	11.166468	8.834543	11.165457	10.001011	9.998989	30	22
39	45	8.833994	11.166006	8.835007	11.164993	10.001013	9.998987	15	21
40	55	8.834456	11.165544	8.835471	11.164529	10.001016	9.998984	5	20
41	15	8.834917	11.165083	8.835934	11.164066	10.001018	9.998982	45	19
42	30	8.835377	11.164623	8.836397	11.163603	10.001020	9.998980	30	18
43	45	8.835837	11.164163	8.836859	11.163141	10.001022	9.998978	15	17
44	56	8.836297	11.163703	8.837321	11.162679	10.001024	9.998976	4	16
45	15	8.836756	11.163244	8.837782	11.162218	10.001026	9.998974	45	15
46	30	8.837215	11.162785	8.838243	11.161757	10.001029	9.998971	30	14
47	45	8.837673	11.162327	8.838703	11.161297	10.001031	9.998969	15	13
48	57	8.838130	11.161870	8.839163	11.160837	10.001033	9.998967	3	12
49	15	8.838587	11.161413	8.839623	11.160377	10.001035	9.998965	45	11
50	30	8.839044	11.160956	8.840081	11.159919	10.001037	9.998963	30	10
51	45	8.839500	11.160500	8.840540	11.159460	10.001039	9.998961	15	9
52	58	8.839956	11.160044	8.840998	11.159002	10.001042	9.998958	2	8
53	15	8.840411	11.159589	8.841455	11.158545	10.001044	9.998956	45	7
54	30	8.840866	11.159134	8.841912	11.158088	10.001046	9.998954	30	6
55	45	8.841320	11.158680	8.842368	11.157632	10.001048	9.998952	15	5
56	59	8.841774	11.158226	8.842824	11.157176	10.001050	9.998950	1	4
57	15	8.842227	11.157773	8.843280	11.156720	10.001053	9.998947	45	3
58	30	8.842680	11.157320	8.843735	11.156265	10.001055	9.998945	30	2
59	45	8.843133	11.156867	8.844190	11.155810	10.001057	9.998943	15	1
60	60	8.843584	11.156416	8.844644	11.155356	10.001059	9.998941	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
5h 44m.				LOG SINES, &c.				86 deg.	

0h 16m.			LOG. SINES, &c.				4 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	0	8.843584	11.156416	8.844644	11.155356	10.001059	9.998941	60	60
1	15	8.844036	11.155964	8.845097	11.154903	10.001061	9.998939	45	59
2	30	8.844487	11.155513	8.845550	11.154450	10.001064	9.998936	30	58
3	45	8.844937	11. 55063	8.846003	11.153997	10.001066	9.998934	15	57
4	1	8.845387	11. .54613	8.846455	11.153545	10.001068	9.998932	59	56
5	15	8.845837	11.154163	8.846907	11.153093	10.001070	9.998930	45	55
6	30	8.846286	11.153714	8.847358	11.152642	10.001073	9.998927	30	54
7	45	8.846735	11.153265	8.847809	11.152191	10.001075	9.998925	15	53
8	2	8.847183	11.152817	8.848260	11.151740	10.001077	9.998923	58	52
9	15	8.847630	11.152370	8.848710	11.151290	10.001079	9.998921	45	51
10	30	8.848078	11.151922	8.849159	11.150841	10.001081	9.998919	30	50
11	45	8.848524	11.151476	8.849608	11.150392	10.001084	9.998916	15	49
12	3	8.848971	11.151029	8.850057	11.149943	10.001086	9.998914	57	48
13	15	8.849416	11.150584	8.850505	11.149495	10.001088	9.998912	45	47
14	30	8.849862	11.150138	8.850952	11.149048	10.001090	9.998910	30	46
15	45	8.850307	11.149693	8.851399	11.148601	10.001093	9.998907	15	45
16	4	8.850751	11.149249	8.851846	11.148154	10.001095	9.998905	56	44
17	15	8.851195	11.148805	8.852292	11.147708	10.001097	9.998903	45	43
18	30	8.851639	11.148361	8.852738	11.147262	10.001099	9.998901	30	42
19	45	8.852082	11.147918	8.853183	11.146817	10.001102	9.998898	15	41
20	5	8.852524	11.147476	8.853628	11.146372	10.001104	9.998896	55	40
21	15	8.852967	11.147033	8.854073	11.145927	10.001106	9.998894	45	39
22	30	8.853408	11.146592	8.854517	11.145483	10.001108	9.998892	30	38
23	45	8.853850	11.146150	8.854960	11.145040	10.001111	9.998889	15	37
24	6	8.854290	11.145710	8.855403	11.144597	10.001113	9.998887	54	36
25	15	8.854731	11.145269	8.855846	11.144154	10.001115	9.998885	45	35
26	30	8.855171	11.144829	8.856288	11.143712	10.001117	9.998883	30	34
27	45	8.855610	11.144390	8.856730	11.143270	10.001120	9.998880	15	33
28	7	8.856049	11.143951	8.857171	11.142829	10.001122	9.998878	53	32
29	15	8.856488	11.143512	8.857612	11.142388	10.001124	9.998876	45	31
30	30	8.856926	11.143074	8.858053	11.141947	10.001127	9.998873	30	30
31	45	8.857364	11.142636	8.858493	11.141507	10.001129	9.998871	15	29
32	8	8.857801	11.142199	8.858932	11.141068	10.001131	9.998869	52	28
33	15	8.858238	11.141762	8.859371	11.140629	10.001133	9.998867	45	27
34	30	8.858674	11.141326	8.859810	11.140190	10.001136	9.998864	30	26
35	45	8.859110	11.140890	8.860248	11.139752	10.001138	9.998862	15	25
36	9	8.859546	11.140454	8.860686	11.139314	10.001140	9.998860	51	24
37	15	8.859981	11.140019	8.861123	11.138877	10.001143	9.998857	45	23
38	30	8.860415	11.139585	8.861560	11.138440	10.001145	9.998855	30	22
39	45	8.860849	11.139151	8.861997	11.138003	10.001147	9.998853	15	21
40	10	8.861283	11.138717	8.862433	11.137567	10.001149	9.998851	50	20
41	15	8.861717	11.138283	8.862868	11.137132	10.001152	9.998848	45	19
42	30	8.862149	11.137851	8.863303	11.136697	10.001154	9.998846	30	18
43	45	8.862582	11.137418	8.863738	11.136262	10.001156	9.998844	15	17
44	11	8.863014	11.136986	8.864172	11.135828	10.001159	9.998841	49	16
45	15	8.863445	11.136555	8.864606	11.135394	10.001161	9.998839	45	15
46	30	8.863877	11.136123	8.865040	11.134960	10.001163	9.998837	30	14
47	45	8.864307	11.135693	8.865473	11.134527	10.001166	9.998834	15	13
48	12	8.864738	11.135262	8.865905	11.134095	10.001168	9.998832	48	12
49	15	8.865167	11.134833	8.866338	11.133662	10.001170	9.998830	45	11
50	30	8.865597	11.134403	8.866769	11.133231	10.001173	9.998827	30	10
51	45	8.866026	11.133974	8.867201	11.132799	10.001175	9.998825	15	9
52	13	8.866454	11.133546	8.867632	11.132368	10.001177	9.998823	47	8
53	15	8.866883	11.133117	8.868062	11.131938	10.001180	9.998820	45	7
54	30	8.867310	11.132690	8.868492	11.131508	10.001182	9.998818	30	6
55	45	8.867738	11.132262	8.868922	11.131078	10.001184	9.998816	15	5
56	14	8.868165	11.131835	8.869351	11.130649	10.001187	9.998813	46	4
57	15	8.868591	11.131409	8.869780	11.130220	10.001189	9.998811	45	3
58	30	8.869017	11.130983	8.870208	11.129792	10.001191	9.998809	30	2
59	45	8.869443	11.130557	8.870636	11.129364	10.001194	9.998806	15	1
60	15	8.869868	11.130132	8.871064	11.128936	10.001196	9.998804	45	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
5h 43m.			LOG. SINES, &c.				85 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	0h 17m.		LOG. SINES, &c.				4 deg.		
0	15	8.869868	11.130132	8.871064	11.128936	10.001196	9.998804	45	60
1	15	8.870293	11.129707	8.871491	11.128509	10.001198	9.998802	45	59
2	30	8.870717	11.129283	8.871918	11.128082	10.001201	9.998799	30	58
3	45	8.871141	11.128859	8.872344	11.127656	10.001203	9.998797	15	57
4	16	8.871565	11.128435	8.872770	11.127230	10.001205	9.998795	44	56
5	15	8.871988	11.128012	8.873195	11.126805	10.001208	9.998792	45	55
6	30	8.872410	11.127590	8.873620	11.126380	10.001210	9.998790	30	54
7	45	8.872833	11.127167	8.874045	11.125955	10.001212	9.998788	15	53
8	17	8.873255	11.126745	8.874469	11.125531	10.001215	9.998785	43	52
9	15	8.873676	11.126324	8.874893	11.125107	10.001217	9.998783	45	51
10	30	8.874097	11.125903	8.875317	11.124683	10.001220	9.998780	30	50
11	45	8.874518	11.125482	8.875740	11.124260	10.001222	9.998778	15	49
12	18	8.874938	11.125062	8.876162	11.123838	10.001224	9.998776	42	48
13	15	8.875358	11.124642	8.876584	11.123416	10.001227	9.998773	45	47
14	30	8.875777	11.124223	8.877006	11.122994	10.001229	9.998771	30	46
15	45	8.876196	11.123804	8.877428	11.122572	10.001231	9.998769	15	45
16	19	8.876615	11 123385	8.877849	11.122151	10.001234	9.998766	41	44
17	15	8.877033	11.122967	8.878269	11.121731	10.001236	9.998764	45	43
18	30	8.877451	11.122549	8.878689	11.121311	10.001239	9.998761	30	42
19	45	8.877868	11.122132	8.879109	11.120891	10.001241	9.998759	15	41
20	20	8.878285	11.121715	8.879529	11.120471	10.001243	9.998757	40	40
21	15	8.878702	11.121298	8.879948	11.120052	10.001246	9.998754	45	39
22	30	8.879118	11.120882	8.880366	11.119634	10.001248	9.998752	30	38
23	45	8.879534	11.120466	8.880784	11.119216	10.001251	9.998749	15	37
24	21	8.879949	11.120051	8.881202	11.118798	10.001253	9.998747	39	36
25	15	8.880364	11.119636	8.881620	11.118380	10.001255	9.998745	45	35
26	30	8.880779	11.119221	8.882037	11.117963	10.001258	9.998742	30	34
27	45	8.881193	11.118807	8.882453	11.117547	10.001260	9.998740	15	33
28	22	8.881607	11.118393	8.882869	11.117131	10.001263	9.998737	38	32
29	15	8.882020	11.117980	8.883285	11.116715	10.001265	9.998735	45	31
30	30	8.882433	11.117567	8.883701	11.116299	10.001267	9.998733	30	30
31	45	8.882846	11.117154	8.884116	11.115884	10.001270	9.998730	15	29
32	23	8.883258	11.116742	8.884530	11.115470	10.001272	9.998728	37	28
33	15	8.883670	11.116330	8.884945	11.115055	10.001275	9.998725	45	27
34	30	8.884081	11.115919	8.885358	11.114642	10.001277	9.998723	30	26
35	45	8.884492	11.115508	8.885772	11.114228	10.001279	9.998721	15	25
36	24	8.884903	11.115097	8.886185	11.113815	10.001282	9.998718	36	24
37	15	8.885313	11.114687	8.886598	11.113402	10.001284	9.998716	45	23
38	30	8.885723	11.114277	8.887010	11.112990	10.001287	9.998713	30	22
39	45	8 886133	11.113867	8.887422	11.112578	10.001289	9.998711	15	21
40	25	8.886542	11.113458	8.887833	11.112167	10.001292	9.998708	35	20
41	15	8.886950	11.113050	8.888244	11.111756	10.001294	9.998706	45	19
42	30	8.887359	11.112641	8.888655	11.111345	10.001297	9.998703	30	18
43	45	8.887767	11.112233	8.889066	11.110934	10.001299	9.998701	15	17
44	26	8.888174	11.111826	8.889476	11.110524	10.001301	9.998699	34	16
45	15	8.888581	11.111419	8.889885	11.110115	10.001304	9.998696	45	15
46	30	8.888988	11.111012	8.890294	11.109706	10.001306	9.998694	30	14
47	45	8.889395	11.110605	8.890703	11.109297	10.001309	9.998691	15	13
48	27	8.889801	11.110199	8.891112	11.108888	10.001311	9.998689	33	12
49	15	8.890206	11.109794	8.891520	11.108480	10.001314	9.998686	45	11
50	30	8.890612	11.109388	8.891928	11.108072	10.001316	9.998684	30	10
51	45	8.891016	11.108984	8.892335	11.107665	10.001319	9.998681	15	9
52	28	8.891421	11.108579	8.892742	11.107258	10.001321	9.998679	32	8
53	15	8.891825	11.108175	8.893148	11.106852	10.001324	9.998676	45	7
54	30	8.892229	11.107771	8.893555	11.106445	10.001326	9.998674	30	6
55	45	8.892632	11.107368	8.893961	11.106039	10.001329	9.998671	15	5
56	29	8.893035	11.106965	8.894366	11.105634	10.001331	9.998669	31	4
57	15	8.893438	11.106562	8.894771	11.105229	10.001333	9.998667	45	3
58	30	8.893840	11.106160	8.895176	11.104824	10.001336	9.998664	30	2
59	45	8.894242	11.105758	8.895580	11.104420	10.001338	9.998662	15	1
60	30	8.894643	11.105357	8.895984	11.104016	10.001341	9.998659	30	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	5h 42m		LOG. SINES, &c.				85 deg.		

0h 18m.			LOG. SINES, &c.			4 deg.			
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	30	8.894643	11.105357	8.895984	11.104016	10.001341	9.998659	30	60
1	15	8.895044	11.104956	8.896388	11.103612	10.001343	9.998657	45	59
2	30	8.895445	11.104555	8.896791	11.103209	10.001346	9.998654	30	58
3	45	8.895845	11.104155	8.897194	11.102806	10.001348	9.998652	15	57
4	31	8.896245	11.103755	8.897596	11.102404	10.001351	9.998649	29	56
5	15	8.896645	11.103355	8.897998	11.102002	10.001353	9.998647	45	55
6	30	8.897044	11.102956	8.898400	11.101600	10.001356	9.998644	30	54
7	45	8.897443	11.102557	8.898802	11.101198	10.001358	9.998642	15	53
8	32	8.897842	11.102158	8.899203	11.100797	10.001361	9.998639	28	52
9	15	8.898240	11.101760	8.899603	11.100397	10.001363	9.998637	45	51
10	30	8.898638	11.101362	8.900004	11.099996	10.001366	9.998634	30	50
11	45	8.899035	11.100965	8.900403	11 099597	10.001368	9.998632	15	49
12	33	8.899432	11.100568	8.900803	11.099197	10.001371	9.998629	27	48
13	15	8.899829	11.100171	8.901202	11.098798	10.001373	9.998627	45	47
14	30	8.900225	11.099775	8.901601	11.098399	10.001376	9.998624	30	46
15	45	8.900621	11.099379	8.902000	11.098000	10.001378	9.998622	15	45
16	34	8.901017	11.093983	8.902398	11.097602	10.001381	9.998619	26	44
17	15	8.901412	11.098588	8.902795	11.097205	10.001383	9.998617	45	43
18	30	8.901807	11.098193	8.903193	11.096807	10.001386	9.998614	30	42
19	45	8.902201	11.097799	8.903590	11.096410	10.001389	9.998611	15	41
20	35	8.902595	11.097405	8.903987	11.096013	10.001391	9.998609	25	40
21	15	8.902989	11.097011	8.904383	11.095617	10.001394	9.998606	45	39
22	30	8.903383	11.096617	8.904779	11.095221	10.001396	9.998604	30	38
23	45	8.903776	11.096224	8.905174	11.094826	10.001399	9.998601	15	37
24	36	8.904168	11.095832	8.905570	11.094430	10.001401	9.998599	24	36
25	15	8.904561	11.095439	8.905965	11.094035	10.001404	9.998596	45	35
26	30	8.904953	11.095047	8.906359	11.093641	10.001406	9.998594	30	34
27	45	8.905345	11.094655	8.906753	11.093247	10.001409	9.998591	15	33
28	37	8.905736	11.094264	8.907147	11.092853	10.001411	9.998589	23	32
29	15	8.906127	11.093873	8.907541	11.092459	10.001414	9.998586	45	31
30	30	8.906517	11.093483	8.907934	11.092066	10.001417	9.998583	30	30
31	45	8 906908	11.093092	8.908327	11.091673	10.001419	9.998581	15	29
32	38	8.907297	11.092703	8.908719	11.091281	10.001422	9.998578	22	28
33	15	8.907687	11.092313	8.909111	11.090889	10.001424	9.998576	45	27
34	30	8.908076	11.091924	8.909503	11.090497	10.001427	9.998573	30	26
35	45	8.908465	11.091535	8.909894	11.090106	10.001429	9.998571	15	25
36	39	8.908853	11.091147	8.910285	11.089715	10.001432	9.998568	21	24
37	15	8.909242	11.090758	8.910676	11.089324	10.001434	9.998566	45	23
38	30	8.909629	11.090371	8.911066	11.088934	10.001437	9.998563	30	22
39	45	8.910017	11.089983	8.911456	11.088544	10.001440	9.998560	15	21
40	40	8.910404	11.089596	8.911846	11.088154	10.001442	9.998558	20	20
41	15	8.910791	11.089209	8.912235	11.087765	10.001445	9.998555	45	19
42	30	8.911177	11.088823	8.912624	11.087376	10.001447	9.998553	30	18
43	45	8.911563	11.088437	8.913013	11.086987	10.001450	9.998550	15	17
44	41	8.911949	11.088051	8.913401	11.086599	10.001453	9.998547	19	16
45	15	8.912334	11.087666	8.913789	11.086211	10.001455	9.998545	45	15
46	30	8.912719	11.087281	8.914177	11.085823	10.001458	9.998542	30	14
47	45	8.913104	11.086896	8.914564	11.085436	10.001460	9.998540	15	13
48	42	8.913488	11.086512	8.914951	11.085049	10.001463	9.998537	18	12
49	15	8.913872	11.086128	8.915337	11.084663	10.001465	9.998535	45	11
50	30	8.914256	11.085744	8.915724	11.084276	10.001468	9.998532	30	10
51	45	8.914639	11.085361	8.916110	11.083890	10.001471	9.998529	15	9
52	43	8.915022	11.084978	8.916495	11.083505	10.001473	9.998527	17	8
53	15	8.915404	11.084596	8.916880	11.083120	10.001476	9.998524	45	7
54	30	8.915787	11.084213	8.917265	11.082735	10.001478	9.998522	30	6
55	45	8.916169	11.083831	8.917650	11.082350	10.001481	9.998519	15	5
56	44	8.916550	11.083450	8.918034	11.081966	10.001484	9.998516	16	4
57	15	8.916932	11.083068	8.918418	11.081582	10.001486	9.998514	45	3
58	30	8.917312	11.0826-8	8.918801	11.081199	10.001489	9.998511	30	2
59	45	8.917693	11.082307	8.919185	11.080815	10.001492	9.998508	15	1
60	45	8.918073	11.081927	8.919567	11.080433	10.001494	9.998506	15	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
5h 41m.			LOG. SINES, &c.				85 deg.		

0h 19m.			LOG. SINES, &c.			4 deg.			
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	45	8.918073	11.081927	8.919567	11.080433	10.001494	9.998506	15	60
1	15	8.918453	11.081547	8.919950	11.080050	10.001497	9.998503	45	59
2	30	8.918833	11.081167	8.920332	11.079668	10.001499	9.998501	30	58
3	45	8.919212	11.080788	8.920714	11.079286	10.001502	9.998498	15	57
4	46	8.919591	11.080409	8.921096	11.078904	10.001505	9.998495	14	56
5	15	8.919970	11.080030	8.921477	11.078523	10.001507	9.998493	45	55
6	30	8.920348	11.079652	8.921858	11.078142	10.001510	9.998490	30	54
7	45	8.920726	11.079274	8.922238	11.077762	10.001513	9.998487	15	53
8	47	8.921103	11.078897	8.922619	11.077381	10.001515	9.998485	13	52
9	15	8.921481	11.078519	8.922998	11.077002	10.001518	9.998482	45	51
10	30	8.921858	11.078142	8.923378	11.076622	10.001521	9.998479	30	50
11	45	8.922234	11.077766	8.923757	11.076243	10.001523	9.998477	15	49
12	48	8.922610	11.077390	8.924136	11.075864	10.001526	9.998474	12	48
13	15	8.922986	11.077014	8.924515	11.075485	10.001529	9.998471	45	47
14	30	8.923362	11.076638	8.924893	11.075107	10.001531	9.998469	30	46
15	45	8.923737	11.076263	8.925271	11.074729	10.001534	9.998466	15	45
16	49	8.924112	11.075888	8.925649	11.074351	10.001536	9.998464	11	44
17	15	8.924487	11.075513	8.926026	11.073974	10.001539	9.998461	45	43
18	30	8.924861	11.075139	8.926403	11.073597	10.001542	9.998458	30	42
19	45	8.925235	11.074765	8.926780	11.073220	10.001544	9.998456	15	41
20	50	8.925609	11.074391	8.927156	11.072844	10.001547	9.998453	10	40
21	15	8.925982	11.074018	8.927532	11.072468	10.001550	9.998450	45	39
22	30	8.926355	11.073645	8.927908	11.072092	10.001552	9.998448	30	38
23	45	8.926728	11.073272	8.928283	11.071717	10.001555	9.998445	15	37
24	51	8.927100	11.072900	8.928658	11.071342	10.001558	9.998442	9	36
25	15	8.927472	11.072528	8.929033	11.070967	10.001561	9.998439	45	35
26	30	8.927844	11.072156	8.929407	11.070593	10.001563	9.998437	30	34
27	45	8.928215	11.071785	8.929781	11.070219	10.001566	9.998434	15	33
28	52	8.928587	11.071413	8.930155	11.069845	10.001569	9.998431	8	32
29	15	8.928957	11.071043	8.930529	11.069471	10.001571	9.998429	45	31
30	30	8.929328	11.070672	8.930902	11.069098	10.001574	9.998426	30	30
31	45	8.929698	11.070302	8.931275	11.068725	10.001577	9.998423	15	29
32	53	8.930068	11.069932	8.931647	11.068353	10.001579	9.998421	7	28
33	15	8.930437	11.069563	8.932019	11.067981	10.001582	9.998418	45	27
34	30	8.930806	11.069194	8.932391	11.067609	10.001585	9.998415	30	26
35	45	8.931175	11.068825	8.932763	11.067237	10.001587	9.998413	15	25
36	54	8.931544	11.068456	8.933134	11.066866	10.001590	9.998410	6	24
37	15	8.931912	11.068088	8.933505	11.066495	10.001593	9.998407	45	23
38	30	8.932280	11.067720	8.933876	11.066124	10.001596	9.998404	30	22
39	45	8.932648	11.067352	8.934246	11.065754	10.001598	9.998402	15	21
40	55	8.933015	11.066985	8.934616	11.065384	10.001601	9.998399	5	20
41	15	8.933382	11.066618	8.934986	11.065014	10.001604	9.998396	45	19
42	30	8.933749	11.066251	8.935355	11.064645	10.001606	9.998394	30	18
43	45	8.934115	11.065885	8.935724	11.064276	10.001609	9.998391	15	17
44	56	8.934481	11.065519	8.936093	11.063907	10.001612	9.998388	4	16
45	15	8.934847	11.065153	8.936461	11.063539	10.001615	9.998385	45	15
46	30	8.935212	11.064788	8.936830	11.063170	10.001617	9.998383	30	14
47	45	8.935577	11.064423	8.937197	11.062803	10.001620	9.998380	15	13
48	57	8.935942	11.064058	8.937565	11.062435	10.001623	9.998377	3	12
49	15	8.936307	11.063693	8.937932	11.062068	10.001626	9.998374	45	11
50	30	8.936671	11.063329	8.938299	11.061701	10.001628	9.998372	30	10
51	45	8.937035	11.062965	8.938666	11.061334	10.001631	9.998369	15	9
52	58	8.937398	11.062602	8.939032	11.060968	10.001634	9.998366	2	8
53	15	8.937762	11.062238	8.939398	11.060602	10.001637	9.998363	45	7
54	30	8.938125	11.061875	8.939764	11.060236	10.001639	9.998361	30	6
55	45	8.938487	11.061513	8.940129	11.059871	10.001642	9.998358	15	5
56	59	8.938850	11.061150	8.940494	11.059506	10.001645	9.998355	1	4
57	15	8.939212	11.060788	8.940859	11.059141	10.001648	9.998352	45	3
58	30	8.939573	11.060427	8.941224	11.058776	10.001650	9.998350	30	2
59	45	8.939935	11.060065	8.941588	11.058412	10.001653	9.998347	15	1
60	60	8.940296	11.059704	8.941952	11.058048	10.001656	9.998344	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
5h 40m.			LOG. SINES, &c.			85 deg.			

0h 20m.			LOG. SINES, &c.				5 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	0	8.940296	11.059704	8.941952	11.058048	10.001656	9.998344	60	60
1	15	8.940657	11.059343	8.942315	11.057685	10.001659	9.998341	45	59
2	30	8.941017	11.058983	8.942679	11.057321	10.001661	9.998339	30	58
3	45	8.941378	11.058622	8.943042	11.056958	10.001664	9.998336	15	57
4	1	8.941738	11.058262	8.943404	11.056596	10.001667	9.998333	59	56
5	15	8.942097	11.057903	8.943767	11.056233	10.001670	9.998330	45	55
6	30	8.942456	11.057544	8.944129	11.055871	10.001672	9.998328	30	54
7	45	8.942816	11.057184	8.944491	11.055509	10.001675	9.998325	15	53
8	2	8.943174	11.056826	8.944852	11.055148	10.001678	9.998322	58	52
9	15	8.943533	11.056467	8.945213	11.054787	10.001681	9.998319	45	51
10	30	8.943891	11.056109	8.945574	11.054426	10.001684	9.998316	30	50
11	45	8.944249	11.055751	8.945935	11.054065	10.001686	9.998314	15	49
12	3	8.944606	11.055394	8.946295	11.053705	10.001689	9.998311	57	48
13	15	8.944963	11.055037	8.946655	11.053345	10.001692	9.998308	45	47
14	30	8.945320	11.054680	8.947015	11.052985	10.001695	9.998305	30	46
15	45	8.945677	11.054323	8.947375	11.052625	10.001698	9.998302	15	45
16	4	8.946033	11.053967	8.947734	11.052266	10.001700	9.998300	56	44
17	15	8.946390	11.053610	8.948093	11.051907	10.001703	9.998297	45	43
18	30	8.946745	11.053255	8.948451	11.051549	10.001706	9.998294	30	42
19	45	8.947101	11.052899	8.948810	11.051190	10.001709	9.998291	15	41
20	5	8.947456	11.052544	8.949168	11.050832	10.001712	9.998288	55	40
21	15	8.947811	11.052189	8.949525	11.050475	10.001714	9.998286	45	39
22	30	8.948166	11.051834	8.949883	11.050117	10.001717	9.998283	30	38
23	45	8.948520	11.051480	8.950240	11.049760	10.001720	9.998280	15	37
24	6	8.948874	11.051126	8.950597	11.049403	10.001723	9.998277	54	36
25	15	8.949228	11.050772	8.950953	11.049047	10.001726	9.998274	45	35
26	30	8.949581	11.050419	8.951309	11.048691	10.001728	9.998272	30	34
27	45	8.949934	11.050066	8.951665	11.048335	10.001731	9.998269	15	33
28	7	8.950287	11.049713	8.952021	11.047979	10.001734	9.998266	53	32
29	15	8.950640	11.049360	8.952376	11.047624	10.001737	9.998263	45	31
30	30	8.950992	11.049008	8.952732	11.047268	10.001740	9.998260	30	30
31	45	8.951344	11.048656	8.953086	11.046914	10.001743	9.998257	15	29
32	8	8.951696	11.048304	8.953441	11.046559	10.001745	9.998255	52	28
33	15	8.952047	11.047953	8.953795	11.046205	10.001748	9.998252	45	27
34	30	8.952398	11.047602	8.954149	11.045851	10.001751	9.998249	30	26
35	45	8.952749	11.047251	8.954503	11.045497	10.001754	9.998246	15	25
36	9	8.953100	11.046900	8.954856	11.045144	10.001757	9.998243	51	24
37	15	8.953450	11.046550	8.955209	11.044791	10.001760	9.998240	45	23
38	30	8.953800	11.046200	8.955562	11.044438	10.001762	9.998238	30	22
39	45	8.954150	11.045850	8.955915	11.044085	10.001765	9.998235	15	21
40	10	8.954499	11.045501	8.956267	11.043733	10.001768	9.998232	50	20
41	15	8.954848	11.045152	8.956619	11.043381	10.001771	9.998229	45	19
42	30	8.955197	11.044803	8.956971	11.043029	10.001774	9.998226	30	18
43	45	8.955546	11.044454	8.957322	11.042678	10.001777	9.998223	15	17
44	11	8.955894	11.044106	8.957673	11.042327	10.001780	9.998220	49	16
45	15	8.956242	11.043758	8.958024	11.041976	10.001783	9.998217	45	15
46	30	8.956590	11.043410	8.958375	11.041625	10.001785	9.998215	30	14
47	45	8.956937	11.043063	8.958725	11.041275	10.001788	9.998212	15	13
48	12	8.957284	11.042716	8.959075	11.040925	10.001791	9.998209	48	12
49	15	8.957631	11.042369	8.959425	11.040575	10.001794	9.998206	45	11
50	30	8.957978	11.042022	8.959775	11.040225	10.001797	9.998203	30	10
51	45	8.958324	11.041676	8.960124	11.039876	10.001800	9.998200	15	9
52	13	8.958670	11.041330	8.960473	11.039527	10.001803	9.998197	47	8
53	15	8.959016	11.040984	8.960821	11.039179	10.001806	9.998194	45	7
54	30	8.959361	11.040639	8.961170	11.038830	10.001808	9.998192	30	6
55	45	8.959707	11.040293	8.961518	11.038482	10.001811	9.998189	15	5
56	14	8.960052	11.039948	8.961866	11.038134	10.001814	9.998186	46	4
57	15	8.960396	11.039604	8.962213	11.037787	10.001817	9.998183	45	3
58	30	8.960741	11.039259	8.962561	11.037439	10.001820	9.998180	30	2
59	45	8.961085	11.038915	8.962908	11.037092	10.001823	9.998177	15	1
60	15	8.961429	11.038571	8.963254	11.036746	10.001826	9.998174	45	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
5h 39m.			LOG. SINES, &c.				84 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	$0^h\ 21^m$.		LOG. SINES, &c.				5 deg.		
0	15	8.961429	11.038571	8.963254	11.036746	10.001826	9.998174	45	60
1	15	8.961772	11.038228	8.963601	11.036399	10.001829	9.998171	45	59
2	30	8.962116	11.037884	8.963947	11.036053	10.001832	9.998168	30	58
3	45	8.962459	11.037541	8.964293	11.035707	10.001834	9.998166	15	57
4	16	8.962801	11.037199	8.964639	11.035361	10.001837	9.998163	44	56
5	15	8.963144	11.036856	8.964984	11.035016	10.001840	9.998160	45	55
6	30	8.963486	11.036514	8.965329	11.034671	10.001843	9.998157	30	54
7	45	8.963828	11.036172	8.965674	11.034326	10.001846	9.998154	15	53
8	17	8.964170	11.035830	8.966019	11.033981	10.001849	9.998151	43	52
9	15	8.964511	11.035489	8.966363	11.033637	10.001852	9.998148	45	51
10	30	8.964852	11.035148	8.966707	11.033293	10.001855	9.998145	30	50
11	45	8.965193	11.034807	8.967051	11.032949	10.001858	9.998142	15	49
12	18	8.965534	11.034466	8.967394	11.032606	10.001861	9.998139	42	48
13	15	8.965874	11.034126	8.967738	11.032262	10.001864	9.998136	45	47
14	30	8.966214	11.033786	8.968081	11.031919	10.001867	9.998133	30	46
15	45	8.966554	11.033446	8.968423	11.031577	10.001870	9.998130	15	45
16	19	8.966893	11.033107	8.968766	11.031234	10.001873	9.998127	41	44
17	15	8.967233	11.032767	8.969108	11.030892	10.001875	9.998125	45	43
18	30	8.967572	11.032428	8.969450	11.030550	10.001878	9.998122	30	42
19	45	8.967910	11.032090	8.969792	11.030208	10.001881	9.998119	15	41
20	20	8.968249	11.031751	8.970133	11.029867	10.001884	9.998116	40	40
21	15	8.968587	11.031413	8.970474	11.029526	10.001887	9.998113	45	39
22	30	8.968925	11.031075	8.970815	11.029185	10.001890	9.998110	30	38
23	45	8.969262	11.030738	8.971156	11.028844	10.001893	9.998107	15	37
24	21	8.969600	11.030400	8.971496	11.028504	10.001896	9.998104	39	36
25	15	8.969937	11.030063	8.971836	11.028164	10.001899	9.998101	45	35
26	30	8.970274	11.029726	8.972176	11.027824	10.001902	9.998098	30	34
27	45	8.970610	11.029390	8.972515	11.027485	10.001905	9.998095	15	33
28	22	8.970947	11.029053	8.972855	11.027145	10.001908	9.998092	38	32
29	15	8.971283	11.028717	8.973194	11.026806	10.001911	9.998089	45	31
30	30	8.971619	11.028381	8.973532	11.026468	10.001914	9.998086	30	30
31	45	8.971954	11.028046	8.973871	11.026129	10.001917	9.998083	15	29
32	23	8.972289	11.027711	8.974209	11.025791	10.001920	9.998080	37	28
33	15	8.972624	11.027376	8.974547	11.025453	10.001923	9.998077	45	27
34	30	8.972959	11.027041	8.974885	11.025115	10.001926	9.998074	30	26
35	45	8.973294	11.026706	8.975222	11.024778	10.001929	9.998071	15	25
36	24	8.973628	11.026372	8.975560	11.024440	10.001932	9.998068	36	24
37	15	8.973962	11.026038	8.975897	11.024103	10.001935	9.998065	45	23
38	30	8.974296	11.025704	8.976233	11.023767	10.001938	9.998062	30	22
39	45	8.974629	11.025371	8.976570	11.023430	10.001941	9.998059	15	21
40	25	8.974962	11.025038	8.976906	11.023094	10.001944	9.998056	35	20
41	15	8.975295	11.024705	8.977242	11.022758	10.001947	9.998053	45	19
42	30	8.975628	11.024372	8.977578	11.022422	10.001950	9.998050	30	18
43	45	8.975960	11.024040	8.977913	11.022087	10.001953	9.998047	15	17
44	26	8.976293	11.023707	8.978248	11.021752	10.001956	9.998044	34	16
45	15	8.976624	11.023376	8.978583	11.021417	10.001959	9.998041	45	15
46	30	8.976956	11.023044	8.978918	11.021092	10.001962	9.998038	30	14
47	45	8.977288	11.022712	8.979252	11.020748	10.001965	9.998035	15	13
48	27	8.977619	11.022381	8.979586	11.020414	10.001968	9.998032	33	12
49	15	8.977950	11.022050	8.979920	11.020080	10.001971	9.998029	45	11
50	30	8.978280	11.021720	8.980254	11.019746	10.001974	9.998026	30	10
51	45	8.978611	11.021389	8.980587	11.019413	10.001977	9.998023	15	9
52	28	8.978941	11.021059	8.980921	11.019079	10.001980	9.998020	32	8
53	15	8.979271	11.020729	8.981253	11.018747	10.001983	9.998017	45	7
54	30	8.979600	11.020400	8.981586	11.018414	10.001986	9.998014	30	6
55	45	8.979930	11.020070	8.981919	11.018081	10.001989	9.998011	15	5
56	29	8.980259	11.019741	8.982251	11.017749	10.001992	9.998008	31	4
57	15	8.980588	11.019412	8.982583	11.017417	10.001995	9.998005	45	3
58	30	8.980916	11.019084	8.982914	11.017086	10.001998	9.998002	30	2
59	45	8.981245	11.018755	8.983246	11.016754	10.002001	9.997999	15	1
60	30	8.981573	11.018427	8.983577	11.016423	10.002004	9.997996	30	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$5^h\ 38^m$.		LOG. SINES, &c.				84 deg.		

0h 22m.			LOG. SINES, &c.				5 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	30	8.981573	11.018427	8.983577	11.016423	10.002004	9.997996	30	60
1	15	8.981901	11.018099	8.983908	11.016092	10.002007	9.997993	45	59
2	30	8.982228	11.017772	8.984238	11.015762	10.002010	9.997990	30	58
3	45	8.982556	11.017444	8.984569	11.015431	10.002013	9.997987	15	57
4	31	8.982883	11.017117	8.984899	11.015101	10.002016	9.997984	29	56
5	15	8.983210	11.016790	8.985229	11.014771	10.002019	9.997981	45	55
6	30	8.983536	11.016464	8.985559	11.014441	10.002022	9.997978	30	54
7	45	8.983863	11.016137	8.985888	11.014112	10.002025	9.997975	15	53
8	32	8.984189	11.015811	8.986217	11.013783	10.002028	9.997972	28	52
9	15	8.984515	11.015485	8.986546	11.013454	10.002032	9.997968	45	51
10	30	8.984840	11.015160	8.986875	11.013125	10.002035	9.997965	30	50
11	45	8.985166	11.014834	8.987203	11.012797	10.002038	9.997962	15	49
12	33	8.985491	11.014509	8.987532	11.012468	10.002041	9.997959	27	48
13	15	8.985816	11.014184	8.987860	11.012140	10.002044	9.997956	45	47
14	30	8.986140	11.013860	8.988187	11.011813	10.002047	9.997953	30	46
15	45	8.986465	11.013535	8.988515	11.011485	10.002050	9.997950	15	45
16	34	8.986789	11.013211	8.988842	11 011158	10.002053	9.997947	26	44
17	15	8.987113	11.012887	8.989169	11.010831	10.002056	9.997944	45	43
18	30	8.987437	11.012563	8.989496	11 010504	10.002059	9.997941	30	42
19	45	8.987760	11.012240	8.989822	11.010178	10.002062	9.997938	15	41
20	35	8.988083	11.011917	8.990149	11.009851	10·002065	9.997935	25	40
21	15	8.988406	11.011594	8.990475	11.009525	10.002068	9.997932	45	39
22	30	8.988729	11.011271	8.990800	11.009200	10.002072	9.997928	30	38
23	45	8.989051	11.010949	8.991126	11.008874	10.002075	9.997925	15	37
24	36	8.989374	11.010626	8.991451	11 008549	10.002078	9.997922	24	36
25	15	8.989696	11.010304	8.991776	11.008224	10.002081	9.997919	45	35
26	30	8.990017	11.009983	8.992101	11.007899	10.002084	9.997916	30	34
27	45	8.990339	11.009661	8.992426	11.007574	10.002087	9.997913	15	33
28	37	8.990660	11.009340	8.992750	11.007250	10.002090	9.997910	23	32
29	15	8.990981	11.009019	8.993074	11.006926	10.002093	9.997907	45	31
30	30	8.991302	11.008698	8.993398	11.006602	10.002096	9.997904	30	30
31	45	8.991623	11.008377	8.993722	11.006278	10.002099	9.997901	15	29
32	38	8.991943	11.008057	8.994045	11.005955	10.002103	9.997897	22	28
33	15	8.992263	11.007737	8.994369	11.005631	10.002106	9.997894	45	27
34	30	8.992583	11.007417	8.994691	11.005309	10.002109	9.997891	30	26
35	45	8.992902	11.007098	8.995014	11.004986	10.002112	9.997888	15	25
36	39	8.993222	11.006778	8.995337	11.004663	10.002115	9.997885	21	24
37	15	8.993541	11.006459	8.995659	11.004341	10.002118	9.997882	45	23
38	30	8.993860	11.006140	8.995981	11.004019	10.002121	9.997879	30	22
39	45	8.994178	11.005822	8.996303	11.003697	10.002124	9.997876	15	21
40	40	8.994497	11.005503	8.996624	11.003376	10.002128	9.997872	20	20
41	15	8.994815	11.005185	8.996946	11.003054	10.002131	9.997869	45	19
42	30	8.995133	11.004867	8.997267	11.002733	10.002134	9.997866	30	18
43	45	8.995451	11.004549	8.997587	11.002413	10.002137	9.997863	15	17
44	41	8.995768	11.004232	8.997908	11.002092	10.002140	9.997860	19	16
45	15	8.996085	11.003915	8.998228	11.001772	10.002143	9.997857	45	15
46	30	8.996402	11.003598	8.998549	11.001451	10.002146	9.997854	30	14
47	45	8.996719	11.003281	8.998869	11.001131	10.002150	9.997850	15	13
48	42	8.997036	11.002964	8.999188	11.000812	10.002153	9.997847	18	12
49	15	8.997352	11.002648	8.999508	11.000492	10.002156	9.997844	45	11
50	30	8.997668	11.002332	8.999827	11.000173	10.002159	9.997841	30	10
51	45	8.997984	11.002016	9.000146	10.999854	10.002162	9.997838	15	9
52	43	8.998299	11.001701	9.000465	10.999535	10.002165	9.997835	17	8
53	15	8.998615	11.001385	9.000783	10.999217	10.002169	9.997831	45	7
54	30	8.998930	11.001070	9.001102	10.998898	10.002172	9.997828	30	6
55	45	8.999245	11.000755	9.001420	10.998580	10.002175	9.997825	15	5
56	44	8.999559	11.000441	9.001737	10.998263	10.002178	9.997822	16	4
57	15	8.999874	11.000126	9.002055	10.997945	10.002181	9.997819	45	3
58	30	9.000188	10.999812	9.002372	10.997628	10.002184	9.997816	30	2
59	45	9.000502	10.999498	9.002690	10.997310	10.002188	9.997812	15	1
60	45	9.000816	10.999184	9.003007	10.996993	10.002191	9.997809	15	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
5h 37m.			LOG. SINES, &c.				84 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0h 23m.		LOG. SINES, &c.						5 deg.	
0	45	9.000816	10.999184	9.003007	10.996993	10.002191	9.997809	15	60
1	15	9.001129	10.998871	9.003323	10.996677	10.002194	9.997806	45	59
2	30	9.001443	10.998557	9.003640	10.996360	10.002197	9.997803	30	58
3	45	9.001756	10.998244	9.003956	10.996044	10.002200	9.997800	15	57
4	46	9.002069	10.997931	9.004272	10.995728	10.002203	9.997797	14	56
5	15	9.002381	10.997619	9.004588	10.995412	10.002207	9.997793	45	55
6	30	9.002694	10.997306	9.004903	10.995097	10.002210	9.997790	30	54
7	45	9.003006	10.996994	9.005219	10.994781	10.002213	9.997787	15	53
8	47	9.003318	10.996682	9.005534	10.994466	10.002216	9.997784	13	52
9	15	9.003630	10.996370	9.005849	10.994151	10.002219	9.997781	45	51
10	30	9.003941	10.996059	9.006164	10.993836	10.002223	9.997777	30	50
11	45	9.004252	10.995748	9.006478	10.993522	10.002226	9.997774	15	49
12	48	9.004563	10.995437	9.006792	10.993208	10.002229	9.997771	12	48
13	15	9.004874	10.995126	9.007106	10.992894	10.002232	9.997768	45	47
14	30	9.005185	10.994815	9.007420	10.992580	10.002235	9.997765	30	46
15	45	9.005495	10.994505	9.007734	10.992266	10.002239	9.997761	15	45
16	49	9.005805	10.994195	9.008047	10.991953	10.002242	9.997758	11	44
17	15	9.006115	10.993885	9.008360	10.991640	10.002245	9.997755	45	43
18	30	9.006425	10.993575	9.008673	10.991327	10.002248	9.997752	30	42
19	45	9.006734	10.993266	9.008986	10.991014	10.002252	9.997748	15	41
20	50	9.007044	10.992956	9.009298	10.990702	10.002255	9.997745	10	40
21	15	9.007353	10.992647	9.009611	10.990389	10.002258	9.997742	45	39
22	30	9.007661	10.992339	9.009923	10.990077	10.002261	9.997739	30	38
23	45	9.007970	10.992030	9.010234	10.989766	10.002264	9.997736	15	37
24	51	9.008278	10.991722	9.010546	10.989454	10.002268	9.997732	9	36
25	15	9.008586	10.991414	9.010857	10.989143	10.002271	9.997729	45	35
26	30	9.008894	10.991106	9.011169	10.988831	10.002274	9.997726	30	34
27	45	9.009202	10.990798	9.011479	10.988521	10.002277	9.997723	15	33
28	52	9.009510	10.990490	9.011790	10.988210	10.002281	9.997719	8	32
29	15	9.009817	10.990183	9.012101	10.987899	10.002284	9.997716	45	31
30	30	9.010124	10.989876	9.012411	10.987589	10.002287	9.997713	30	30
31	45	9.010431	10.989569	9.012721	10.987279	10.002290	9.997710	15	29
32	53	9.010737	10.989263	9.013031	10.986969	10.002294	9.997706	7	28
33	15	9.011044	10.988956	9.013341	10.986659	10.002297	9.997703	45	27
34	30	9.011350	10.988650	9.013650	10.986350	10.002300	9.997700	30	26
35	45	9.011656	10.988344	9.013959	10.986041	10.002303	9.997697	15	25
36	54	9.011962	10.988038	9.014268	10.985732	10.002307	9.997693	6	24
37	15	9.012267	10.987733	9.014577	10.985423	10.002310	9.997690	45	23
38	30	9.012572	10.987428	9.014886	10.985114	10.002313	9.997687	30	22
39	45	9.012877	10.987123	9.015194	10.984806	10.002317	9.997683	15	21
40	55	9.013182	10.986818	9.015502	10.984498	10.002320	9.997680	5	20
41	15	9.013487	10.986513	9.015810	10.984190	10.002323	9.997677	45	19
42	30	9.013791	10.986209	9.016118	10.983882	10.002326	9.997674	30	18
43	45	9.014096	10.985904	9.016425	10.983575	10.002330	9.997670	15	17
44	56	9.014400	10.985600	9.016732	10.983268	10.002333	9.997667	4	16
45	15	9.014703	10.985297	9.017039	10.982961	10.002336	9.997664	45	15
46	30	9.015007	10.984993	9.017346	10.982654	10.002339	9.997661	30	14
47	45	9.015310	10.984690	9.017653	10.982347	10.002343	9.997657	15	13
48	57	9.015613	10.984387	9.017959	10.982041	10.002346	9.997654	3	12
49	15	9.015916	10.984084	9.018266	10.981734	10.002349	9.997651	45	11
50	30	9.016219	10.983781	9.018572	10.981428	10.002353	9.997647	30	10
51	45	9.016522	10.983478	9.018877	10.981123	10.002356	9.997644	15	9
52	58	9.016824	10.983176	9.019183	10.980817	10.002359	9.997641	2	8
53	15	9.017126	10.982874	9.019488	10.980512	10.002363	9.997637	45	7
54	30	9.017428	10.982572	9.019794	10.980206	10.002366	9.997634	30	6
55	45	9.017729	10.982271	9.020099	10.979901	10.002369	9.997631	15	5
56	59	9.018031	10.981969	9.020403	10.979597	10.002372	9.997628	1	4
57	15	9.018332	10.981668	9.020708	10.979292	10.002376	9.997624	45	3
58	30	9.018633	10.981367	9.021012	10.978988	10.002379	9.997621	30	2
59	45	9.018934	10.981066	9.021316	10.978684	10.002382	9.997618	15	1
60	60	9.019235	10.980765	9.021620	10.978380	10.002386	9.997614	0	0
sec.	″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
5h 36m.		LOG SINES, &c.						84 deg.	

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
		0h 24m.		LOG. SINES, &c.			6 deg.		
0	0	9.019235	10.980765	9.021620	10.978380	10.002386	9.997614	60	60
1	15	9.019535	10.980465	9.021924	10.978076	10.002389	9.997611	45	59
2	30	9.019835	10.980165	9.022227	10.977773	10.002392	9.997608	30	58
3	45	9.020135	10.979865	9.022531	10.977469	10.002396	9.997604	15	57
4	1	9.020435	10.979565	9.022834	10.977166	10.002399	9.997601	59	56
5	15	9.020734	10.979266	9.023137	10.976863	10.002402	9.997598	45	55
6	30	9.021034	10.978966	9.023439	10.976561	10.002406	9.997594	30	54
7	45	9.021333	10.978667	9.023742	10.976258	10.002409	9.997591	15	53
8	2	9.021632	10.978368	9.024044	10.975956	10.002412	9.997588	58	52
9	15	9.021930	10.978070	9.024346	10.975654	10.002416	9.997584	45	51
10	30	9.022229	10.977771	9.024648	10.975352	10.002419	9.997581	30	50
11	45	9.022527	10.977473	9.024950	10.975050	10.002422	9.997578	15	49
12	3	9.022825	10.977175	9.025251	10.974749	10.002426	9.997574	57	48
13	15	9.023123	10.976877	9.025552	10.974448	10.002429	9.997571	45	47
14	30	9.023421	10.976579	9.025853	10.974147	10.002432	9.997568	30	46
15	45	9.023718	10.976282	9.026154	10.973846	10.002436	9.997564	15	45
16	4	9.024016	10.975984	9.026455	10.973545	10.002439	9.997561	56	44
17	15	9.024313	10.975687	9.026755	10.973245	10.002442	9.997558	45	43
18	30	9.024610	10.975390	9.027055	10.972945	10.002446	9.997554	30	42
19	45	9.024906	10.975094	9.027355	10.972645	10.002449	9.997551	15	41
20	5	9.025203	10.974797	9.027655	10.972345	10.002453	9.997547	55	40
21	15	9.025499	10.974501	9.027955	10.972045	10.002456	9.997544	45	39
22	30	9.025795	10.974205	9.028254	10.971746	10.002459	9.997541	30	38
23	45	9.026091	10.973909	9.028553	10.971447	10.002463	9.997537	15	37
24	6	9.026386	10.973614	9.028852	10.971148	10.002466	9.997534	54	36
25	15	9.026682	10.973318	9.029151	10.970849	10.002469	9.997531	45	35
26	30	9.026977	10.973023	9.029450	10.970550	10.002473	9.997527	30	34
27	45	9.027272	10.972728	9.029748	10.970252	10.002476	9.997524	15	33
28	7	9.027567	10.972433	9.030046	10.969954	10.002480	9.997520	53	32
29	15	9.027862	10.972138	9.030344	10.969656	10.002483	9.997517	45	31
30	30	9.028156	10.971844	9.030642	10.969358	10.002486	9.997514	30	30
31	45	9.028450	10.971550	9.030940	10.969060	10.002490	9.997510	15	29
32	8	9.028744	10.971256	9.031237	10.968763	10.002493	9.997507	52	28
33	15	9.029038	10.970962	9.031534	10.968466	10.002497	9.997503	45	27
34	30	9.029332	10.970668	9.031831	10.968169	10.002500	9.997500	30	26
35	45	9.029625	10.970375	9.032128	10.967872	10.002503	9.997497	15	25
36	9	9.029918	10.970082	9.032425	10.967575	10.002507	9.997493	51	24
37	15	9.030211	10.969789	9.032721	10.967279	10.002510	9.997490	45	23
38	30	9.030504	10.969496	9.033017	10.966983	10.002514	9.997486	30	22
39	45	9.030797	10.969203	9.033313	10.966687	10.002517	9.997483	15	21
40	10	9.031089	10.968911	9.033609	10.966391	10.002520	9.997480	50	20
41	15	9.031381	10.968619	9.033905	10.966095	10.002524	9.997476	45	19
42	30	9.031673	10.968327	9.034200	10.965800	10.002527	9.997473	30	18
43	45	9.031965	10.968035	9.034496	10.965504	10.002531	9.997469	15	17
44	11	9.032257	10.967743	9.034791	10.965209	10.002534	9.997466	49	16
45	15	9.032548	10.967452	9.035085	10.964915	10.002537	9.997463	45	15
46	30	9.032839	10.967161	9.035380	10.964620	10.002541	9.997459	30	14
47	45	9.033130	10.966870	9.035675	10.964325	10.002544	9.997456	15	13
48	12	9.033421	10.966579	9.035969	10.964031	10.002548	9.997452	48	12
49	15	9.033712	10.966288	9.036263	10.963737	10.002551	9.997449	45	11
50	30	9.034002	10.965998	9.036557	10.963443	10.002555	9.997445	30	10
51	45	9.034292	10.965708	9.036850	10.963150	10.002558	9.997442	15	9
52	13	9.034582	10.965418	9.037144	10.962856	10.002561	9.997439	47	8
53	15	9.034872	10.965128	9.037437	10.962563	10.002565	9.997435	45	7
54	30	9.035162	10.964838	9.037730	10.962270	10.002568	9.997432	30	6
55	45	9.035451	10.964549	9.038023	10.961977	10.002572	9.997428	15	5
56	14	9.035741	10.964259	9.038316	10.961684	10.002575	9.997425	46	4
57	15	9.036030	10.963970	9.038608	10.961392	10.002579	9.997421	45	3
58	30	9.036319	10.963681	9.038901	10.961099	10.002582	9.997418	30	2
59	45	9.036607	10.963393	9.039193	10.960807	10.002586	9.997414	15	1
60	15	9.036896	10.963104	9.039485	10.960515	10.002589	9.997411	45	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″	sec.
		h 35m.		LOG. SINES, &c.			83 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	$0^h\ 25^m$.		LOG. SINES, &c.				6 deg.		
0	15	9.036896	10.963104	9.039485	10.960515	10.002589	9.997411	45	60
1	15	9.037184	10.962816	9.039776	10.960224	10.002593	9.997407	45	59
2	30	9.037472	10.962528	9.040068	10.959932	10.002596	9.997404	30	58
3	45	9.037760	10 962240	9.040359	10.959641	10.002599	9.997401	15	57
4	16	9.038048	10.961952	9.040651	10.959349	10.002603	9.997397	44	56
5	15	9.038335	10.961665	9.040942	10.959058	10.002606	9.997394	45	55
6	30	9.038623	10.961377	9.041232	10.958768	10.002610	9.997390	30	54
7	45	9.038910	10.961090	9.041523	10.958477	10.002613	9.997387	15	53
8	17	9.039197	10.960803	9.041813	10.958187	10.002617	9.997383	43	52
9	15	9.039483	10.960517	9.042104	10.957896	10.002620	9.997380	45	51
10	30	9.039770	10.960230	9.042394	10.957606	10.002624	9.997376	30	50
11	45	9.040056	10.959944	9.042683	10.957317	10.002627	9.997373	15	49
12	18	9.040342	10.959658	9.042973	10.957027	10.002631	9.997369	42	48
13	15	9.040628	10.959372	9.043263	10.956737	10.002634	9.997366	45	47
14	30	9.040914	10.959086	9.043552	10.956448	10.002638	9.997362	30	46
15	45	9.041200	10.958800	9.043841	10.956159	10.002641	9 997359	15	45
16	19	9.041485	10.958515	9.044130	10.955870	10.002645	9.997355	41	44
17	15	9.041770	10.958230	9.044419	10.955581	10.002648	9.997352	45	43
18	30	9 042055	10.957945	9.044707	10.955293	10.002652	9.997348	30	42
19	45	9.042340	10.957660	9.044995	10.955005	10.002655	9.997345	15	41
20	20	9.042625	10.957375	9.045284	10.954716	10.002659	9.997341	40	40
21	15	9.042909	10.957091	9.045572	10.954428	10.002662	9.997338	45	39
22	30	9.043194	10.956806	9.045859	10.954141	10.002666	9.997334	30	38
23	45	9.043478	10.956522	9.046147	10.953853	10.002669	9.997331	15	37
24	21	9.043762	10.956238	9.046434	10.953566	10.002673	9.997327	39	36
25	15	9.044045	10.955955	9.046722	10.953278	10.002676	9.997324	45	35
26	30	9.044329	10.955671	9.047009	10.952991	10.002680	9.997320	30	34
27	45	9.044612	10.955388	9.047295	10.952705	10.002683	9.997317	15	33
28	22	9.044895	10.955105	9.047582	10.952418	10.002687	9.997313	38	32
29	15	9.045178	10.954822	9.047869	10.952131	10.002690	9.997310	45	31
30	30	9.045461	10.954539	9.048155	10.951845	10.002694	9.997306	30	30
31	45	9.045744	10.954256	9.048441	10.951559	10.002697	9.997303	15	29
32	23	9.046026	10.953974	9.048727	10.951273	10.002701	9.997299	37	28
33	15	9.046308	10.953692	9.049013	10.950987	10.002704	9.997296	45	27
34	30	9.046590	10.953410	9.049298	10.950702	10.002708	9.997292	30	26
35	45	9.046872	10.953128	9.049584	10.950416	10.002712	9.997288	15	25
36	24	9.047154	10.952846	9.049869	10.950131	10.002715	9.997285	36	24
37	15	9.047435	10.952565	9.050154	10.949846	10.002719	9.997281	45	23
38	30	9.047717	10.952283	9.050439	10.949561	10.002722	9.997278	30	22
39	45	9.047998	10 952002	9.050723	10.949277	10.002726	9.997274	15	21
40	25	9.048279	10.951721	9.051008	10.948992	10.002729	9.997271	35	20
41	15	9.048559	10.951441	9.051292	10.948708	10.002733	9.997267	45	19
42	30	9.048840	10.951160	9.051576	10.948424	10.002736	9.997264	30	18
43	45	9.049120	10.950880	9.051860	10.948140	10.002740	9.997260	15	17
44	26	9.049400	10.950600	9.052144	10.947856	10.002743	9.997257	34	16
45	15	9.049680	10.950320	9.052427	10.947573	10.002747	9.997253	45	15
46	30	9.049960	10.950040	9.052711	10.947289	10.002751	9.997249	30	14
47	45	9.050240	10.949760	9.052994	10.947006	10.002754	9.997246	15	13
48	27	9.050519	10.949481	9.053277	10.946723	10.002758	9.997242	33	12
49	15	9.050799	10.949201	9.053560	10.946440	10.002761	9.997239	45	11
50	30	9.051078	10.948922	9.053843	10.946157	10.002765	9.997235	30	10
51	45	9.051357	10.948643	9.054125	10.945875	10.002768	9.997232	15	9
52	28	9.051635	10.948365	9.054407	10.945593	10.002772	9.997228	32	8
53	15	9.051914	10.948086	9.054689	10.945311	10.002776	9.997224	45	7
54	30	9.052192	10.947808	9.054971	10.945029	10.002779	9.997221	30	6
55	45	9.052470	10.947530	9.055253	10.944747	10.002783	9.997217	15	5
56	29	9.052748	10.947252	9.055535	10.944465	10.002786	9.997214	31	4
57	15	9.053026	10.946974	9.055816	10.944184	10.002790	9.997210	45	3
58	30	9.053304	10.946696	9.056097	10.943903	10.002794	9.997206	30	2
59	45	9.053581	10.946419	9.056379	10.943621	10.002797	9.997203	15	1
60	30	9.053859	10.946141	9.056659	10.943341	10.002801	9.997199	30	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$5^h\ 34^m$.		LOG. SINES, &c.				83 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	$0^h\ 26^m$.		LOG. SINES, &c.					6 deg.	
0	30	9.053859	10.946141	9.056659	10.943341	10.002801	9.997199	30	60
1	15	9.054136	10.945864	9.056940	10.943060	10.002804	9.997196	45	59
2	30	9.054413	10.945587	9.057221	10.942779	10.002808	9.997192	30	58
3	45	9.054689	10.945311	9·057501	10.942498	10.002812	9.997188	15	57
4	31	9.054966	10.945034	9.057781	10.942219	10.002815	9.997185	29	56
5	15	9.055242	10.944758	9.058061	10.941939	10.002819	9.997181	45	55
6	30	9.055519	10.944481	9.058341	10.941659	10.002822	9.997178	30	54
7	45	9.055795	10.944205	9.058621	10.941379	10.002826	9.997174	15	53
8	32	9.056071	10.943929	9.058900	10.941100	10.002830	9.997170	28	52
9	15	9.056346	10.943654	9.059179	10.940821	10.002833	9.997167	45	51
10	30	9.056622	10.943378	9.059459	10.940541	10.002837	9.997163	30	50
11	45	9.056897	10.943103	9.059738	10.940262	10.002840	9.997160	15	49
12	33	9.057172	10.942828	9.060016	10.939984	10.002844	9.997156	27	48
13	15	9.057447	10.942553	9.060295	10.939705	10.002848	9.997152	45	47
14	30	9.057722	10.942278	9.060573	10.939427	10.002851	9.997149	30	46
15	45	9.057997	10.942003	9.060852	10.939148	10.002855	9.997145	15	45
16	34	9.058271	10.941729	9.061130	10.938870	10.002859	9.997141	26	44
17	15	9.058545	10.941455	9.061408	10.938592	10.002862	9.997138	45	43
18	30	9.058819	10.941181	9 061685	10.938315	10.002866	9.997134	30	42
19	45	9.059093	10.940907	9.061963	10.938037	10.002870	9.997130	15	41
20	35	9.059367	10.940633	9.062240	10.937760	10.002873	9.997127	25	40
21	15	9.059641	10.940359	9.062518	10.937482	10.002877	9.997123	45	39
22	30	9.059914	10.940086	9.062795	10.937205	10.002880	9.997120	30	38
23	45	9.060187	10.939813	9.063071	10.936929	10.002884	9.997116	15	37
24	36	9.060460	10.939540	9.063348	10.936652	10.002888	9.997112	24	36
25	15	9.060733	10.939267	9.063625	10.936375	10.002891	9.997109	45	35
26	30	9.061006	10.938994	9.063901	10.936099	10.002895	9.997105	30	34
27	45	9.061278	10.938722	9.064177	10.935823	10.002899	9.997101	15	33
28	37	9 .061551	10.938449	9.064453	10.935547	10.002902	9.997098	23	32
29	15	9.061823	10.938177	9.064729	10.935271	10.002906	9.997094	45	31
30	30	9.062095	10.937905	9.065005	10.934995	10.002910	9.997090	30	30
31	45	9.062367	10.937633	9.065280	10.934720	10.002913	9.997087	15	29
32	38	9.062639	10.937361	9.065556	10.934444	10.002917	9.997083	22	28
33	15	9.062910	10.937090	9.065831	10.934169	10.002921	9.997079	45	27
34	30	9.063181	10.936819	9.066106	10.933894	10.002924	9.997076	30	26
35	45	9.063452	10.936548	9.066381	10.933619	10.002928	9.997072	15	25
36	39	9.063723	10.936277	9.066655	10.933345	10.002932	9.997068	21	24
37	15	9.063994	10.936006	9.066930	10.933070	10.002936	9.997064	45	23
38	30	9.064265	10.935735	9.067204	10.932796	10.002939	9.997061	30	22
39	45	9.064535	10.935465	9.067478	10.932522	10.002943	9.997057	15	21
40	40	9.064806	10.935194	9.067752	10.932248	10.002947	9.997053	20	20
41	15	9.065076	10.934924	9.068026	10.931974	10.002950	9.997050	45	19
42	30	9.065346	10.934654	9.068300	10.931700	10.002954	9.997046	30	18
43	45	9.065616	10.934384	9.068573	10.931427	10.002958	9.997042	15	17
44	41	9.065885	10.934115	9.068846	10.931154	10.002961	9.997039	19	16
45	15	9.066155	10.933845	9.069120	10.930880	10.002965	9.997035	45	15
46	30	9.066424	10.933576	9.069393	10.930607	10.002969	9.997031	30	14
47	45	9.066693	10.933307	9.069665	10.930335	10.002972	9.997028	15	13
48	42	9.066962	10.933038	9.069938	10.930062	10.002976	9.997024	18	12
49	15	9.067231	10.932769	9.070210	10.929790	10.002980	9.997020	45	11
50	30	9.067499	10.932501	9.070483	10.929517	10.002984	9.997016	30	10
51	45	9.067768	10.932232	9.070755	10.929245	10.002987	9.997013	15	9
52	43	9.068036	10.931964	9.071027	10.928973	10.002991	9.997009	17	8
53	15	9.068304	10.931696	9.071299	10.928701	10.002995	9.997005	45	7
54	30	9.068572	10.931428	9.071570	10.928430	10.002998	9.997002	30	6
55	45	9.068840	10.931160	9.071842	10.928158	10.003002	9.996998	15	5
56	44	9.069107	10.930893	9.072113	10.927887	10.003006	9.996994	16	4
57	15	9.069375	10.930625	9.072384	10.927616	10.003010	9.996990	45	3
58	30	9.069642	10.930358	9.072655	10.927345	10.003013	9.996987	30	2
59	45	9.069909	10.930091	9.072926	10.927074	10.003017	9.996983	15	1
60	45	9.070176	10.929824	9.073197	10.926803	10.003021	9.996979	15	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	′ ″	sec.
	$5^h\ 33^m$.		LOG. SINES. &c.					83 deg.	

0h 27m.		LOG. SINES, &c.					6 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	45	9.070176	10.929824	9.073197	10.926803	10.003021	9.996979	15	60
1	15	9.070443	10.929557	9.073467	10.926533	10.003025	9.996975	45	59
2	30	9.070709	10.929291	9.073738	10.926262	10.003028	9.996972	30	58
3	45	9.070976	10.929024	9.074008	10.925992	10.003032	9.996968	15	57
4	46	9.071242	10.928758	9.074278	10.925722	10.003036	9.996964	14	56
5	15	9.071508	10.928492	9.074548	10.925452	10.003040	9.996960	45	55
6	30	9.071774	10.928226	9.074817	10.925183	10.003043	9.996957	30	54
7	45	9.072040	10.927960	9.075087	10.924913	10.003047	9.996953	15	53
8	47	9.072305	10.927695	9.075356	10.924644	10.003051	9.996949	13	52
9	15	9.072571	10.927429	9.075625	10.924375	10.003055	9.996945	45	51
10	30	9.072836	10.927164	9.075894	10.924106	10.003058	9.996942	30	50
11	45	9.073101	10.926899	9.076163	10.923837	10.003062	9.996938	15	49
12	48	9.073366	10.926634	9.076432	10.923568	10.003066	9.996934	12	48
13	15	9.073631	10.926369	9.076701	10.923299	10.003070	9.996930	45	47
14	30	9.073896	10.926104	9.076969	10.923031	10.003073	9.996927	30	46
15	45	9.074160	10.925840	9.077237	10.922763	10.003077	9.996923	15	45
16	49	9.074424	10.925576	9.077505	10.922495	10.003081	9.996919	11	44
17	15	9.074688	10.925312	9.077773	10.922227	10.003085	9.996915	45	43
18	30	9.074952	10.925048	9.078041	10.921959	10.003089	9.996911	30	42
19	45	9.075216	10.924784	9.078308	10.921692	10.003092	9.996908	15	41
20	50	9.075480	10.924520	9.078576	10.921424	10.003096	9.996904	10	40
21	15	9.075743	10.924257	9.078843	10.921157	10.003100	9.996900	45	39
22	30	9.076007	10.923993	9.079110	10.920890	10.003104	9.996896	30	38
23	45	9.076270	10.923730	9.079377	10.920623	10.003107	9.996893	15	37
24	51	9.076533	10.923467	9.079644	10.920356	10.003111	9.996889	9	36
25	15	9.076796	10.923204	9.079911	10.920089	10.003115	9.996885	45	35
26	30	9.077058	10.922942	9.080177	10.919823	10.003119	9.996881	30	34
27	45	9.077321	10.922679	9.080443	10.919557	10.003123	9.996877	15	33
28	52	9.077583	10.922417	9.080710	10.919290	10.003126	9.996874	8	32
29	15	9.077845	10.922155	9.080976	10.919024	10.003130	9.996870	45	31
30	30	9.078107	10.921893	9.081241	10.918759	10.003134	9.996866	30	30
31	45	9.078369	10.921631	9.081507	10.918493	10.003138	9.996862	15	29
32	53	9.078631	10.921369	9.081773	10.918227	10.003142	9.996858	7	28
33	15	9.078892	10.921108	9.082038	10.917962	10.003145	9.996855	45	27
34	30	9.079154	10.920846	9.082303	10.917697	10.003149	9.996851	30	26
35	45	9.079415	10.920585	9.082568	10.917432	10.003153	9.996847	15	25
36	54	9.079676	10.920324	9.082833	10.917167	10.003157	9.996843	6	24
37	15	9.079937	10.920063	9.083098	10.916902	10.003161	9.996839	45	23
38	30	9.080198	10.919802	9.083362	10.916638	10.003165	9.996835	30	22
39	45	9.080458	10.919542	9.083627	10.916373	10.003168	9.996832	15	21
40	55	9.080719	10.919281	9.083891	10.916109	10.003172	9.996828	5	20
41	15	9.080979	10.919021	9.084155	10 915845	10.003176	9.996824	45	19
42	30	9.081239	10.918761	9.084419	10.915581	10.003180	9.996820	30	18
43	45	9.081499	10.918501	9.084683	10.915317	10.003184	9.996816	15	17
44	56	9.081759	10.918241	9.084947	10.915053	10.003188	9.996812	4	16
45	15	9.082019	10.917981	9.085210	10.914790	10.003191	9.996809	45	15
46	30	9.082278	10.917722	9.085473	10.914527	10.003195	9.996805	30	14
47	45	9.082537	10.917463	9.085736	10.914264	10.003199	9.996801	15	13
48	57	9.082797	10.917203	9.086000	10.914000	10.003203	9.996797	3	12
49	15	9.083056	10.916944	9.086262	10.913738	10.003207	9.996793	45	11
50	30	9.083314	10.916686	9.086525	10.913475	10.003211	9.996789	30	10
51	45	9.083573	10.916427	9.086788	10.913212	10.003215	9.996785	15	9
52	58	9.083832	10.916168	9.087050	10.912950	10.003218	9.996782	2	8
53	15	9.084090	10.915910	9.087312	10.912688	10.003222	9.996778	45	7
54	30	9.084348	10.915652	9.087574	10.912426	10.003226	9.996774	30	6
55	45	9.084606	10.915394	9.087836	10.912164	10.003230	9.996770	15	5
56	59	9.084864	10.915136	9.088098	10.911902	10.003234	9.996766	1	4
57	15	9.085122	10.914878	9.088360	10.911640	10.003238	9.996762	45	3
58	30	9.085380	10.914620	9.088621	10.911379	10.003242	9.996758	30	2
59	45	9.085637	10.914363	9.088883	10.911117	10.003245	9.996755	15	1
60	60	9.085894	10.914106	9.089144	10.910856	10.003249	9.996751	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
5h 32m.		LOG. SINES, &c.					83 deg.		

sec.	″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″	′	sec.
		0h 28m.		LOG. SINES, &c.			7 deg.			
0	0	9.085894	10.914106	9.089144	10.910856	10.003249	9.996751		60	60
1	15	9.086152	10.913848	9.089405	10.910595	10.003253	9.996747	45		59
2	30	9.086409	10.913591	9.089666	10.910334	10.003257	9.996743	30		58
3	45	9.086665	10.913335	9.089926	10.910074	10.003261	9.996739	15		57
4	1	9.086922	10.913078	9.090187	10.909813	10.003265	9.996735		59	56
5	15	9.087179	10.912821	9.090447	10.909553	10.003269	9.996731	45		55
6	30	9.087435	10.912565	9.090708	10.909292	10.003273	9.996727	30		54
7	45	9.087691	10.912309	9.090968	10.909032	10.003277	9.996723	15		53
8	2	9.087947	10.912053	9.091228	10.908772	10.003280	9.996720		58	52
9	15	9.088203	10.911797	9.091487	10.908513	10.003284	9.996716	45		51
10	30	9.088459	10.911541	9.091747	10.908253	10.003288	9.996712	30		50
11	45	9.088715	10.911285	9.092007	10.907993	10.003292	9.996708	15		49
12	3	9.088970	10.911030	9.092266	10.907734	10.003296	9.996704		57	48
13	15	9.089225	10.910775	9.092525	10.907475	10.003300	9.996700	45		47
14	30	9.089480	10.910520	9.092784	10.907216	10.003304	9.996696	30		46
15	45	9.089735	10.910265	9.093043	10.906957	10.003308	9.996692	15		45
16	4	9.089990	10.910010	9.093302	10.906698	10.003312	9.996688		56	44
17	15	9.090245	10.909755	9.093561	10.906439	10.003316	9.996684	45		43
18	30	9.090500	10.909500	9.093819	10.906181	10.003320	9.996680	30		42
19	45	9.090754	10.909246	9.094077	10.905923	10.003323	9.996677	15		41
20	5	9.091008	10.908992	9.094335	10.905665	10.003327	9.996673		55	40
21	15	9.091262	10.908738	9.094593	10.905407	10.003331	9.996669	45		39
22	30	9.091516	10.908484	9.094851	10.905149	10.003335	9.996665	30		38
23	45	9.091770	10.908230	9.095109	10.904891	10.003339	9.996661	15		37
24	6	9.092024	10.907976	9.095367	10.904633	10.003343	9.996657		54	36
25	15	9.092277	10.907723	9.095624	10.904376	10.003347	9.996653	45		35
26	30	9.092530	10.907470	9.095881	10.904119	10.003351	9.996649	30		34
27	45	9.092784	10.907216	9.096138	10.903862	10.003355	9.996645	15		33
28	7	9.093037	10.906963	9.096395	10.903605	10.003359	9.996641		53	32
29	15	9.093290	10.906710	9.096652	10.903348	10.003363	9.996637	45		31
30	30	9.093542	10.906458	9.096909	10.903091	10.003367	9.996633	30		30
31	45	9.093795	10.906205	9.097165	10.902835	10.003371	9.996629	15		29
32	8	9.094047	10.905953	9.097422	10.902578	10.003375	9.996625		52	28
33	15	9.094300	10.905700	9.097678	10.902322	10.003379	9.996621	45		27
34	30	9.094552	10.905448	9.097934	10.902066	10.003383	9.996617	30		26
35	45	9.094804	10.905196	9.098190	10.901810	10.003386	9.996614	15		25
36	9	9.095056	10.904944	9.098446	10.901554	10.003390	9.996610		51	24
37	15	9.095307	10.904693	9.098702	10.901298	10.003394	9.996606	45		23
38	30	9.095559	10.904441	9.098957	10.901043	10.003398	9.996602	30		22
39	45	9.095810	10.904190	9.099213	10.900787	10.003402	9.996598	15		21
40	10	9.096061	10.903939	9.099468	10.900532	10.003406	9.996594		50	20
41	15	9.096313	10.903687	9.099723	10.900277	10.003410	9.996590	45		19
42	30	9.096564	10.903436	9.099978	10.900022	10.003414	9.996586	30		18
43	45	9.096814	10.903186	9.100233	10.899767	10.003418	9.996582	15		17
44	11	9.097065	10.902935	9.100487	10.899513	10.003422	9.996578		49	16
45	15	9.097316	10.902684	9.100742	10.899258	10.003426	9.996574	45		15
46	30	9.097566	10.902434	9.100996	10.899004	10.003430	9.996570	30		14
47	45	9.097816	10.902184	9.101250	10.898750	10.003434	9.996566	15		13
48	12	9.098066	10.901934	9.101504	10.898496	10.003438	9.996562		48	12
49	15	9.098316	10.901684	9.101758	10.898242	10.003442	9.996558	45		11
50	30	9.098566	10.901434	9.102012	10.897988	10.003446	9.996554	30		10
51	45	9.098816	10.901184	9.102266	10.897734	10.003450	9.996550	15		9
52	13	9.099065	10.900935	9.102519	10.897481	10.003454	9.996546		47	8
53	15	9.099314	10.900686	9.102772	10.897228	10.003458	9.996542	45		7
54	30	9.099564	10.900436	9.103026	10.896974	10.003462	9.996538	30		6
55	45	9.099813	10.900187	9.103279	10.896721	10.003466	9.996534	15		5
56	14	9.100062	10.899938	9.103532	10.896468	10.003470	9.996530		46	4
57	15	9.100310	10.899690	9.103784	10.896216	10.003474	9.996526	45		3
58	30	9.100559	10.899441	9.104037	10.895963	10.003478	9.996522	30		2
59	45	9.100807	10.899193	9.104290	10.895710	10.003482	9.996518	15		1
60	15	9.101056	10.898944	9.104542	10.895458	10.003486	9.996514		45	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″	′	sec.
		5h 31m.		LOG. SINES, &c.			82 deg.			

0h 29m.			LOG. SINES, &c.			7 deg.			
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	15	9.101056	10.898944	9.104542	10.895458	10.003486	9.996514	45	60
1	15	9.101304	10.898696	9.104794	10.895206	10.003490	9.996510	45	59
2	30	9.101552	10.898448	9.105046	10.894954	10.003494	9.996506	30	58
3	45	9.101800	10.898200	9.105298	10.894702	10.003498	9.996502	15	57
4	16	9.102048	10.897952	9.105550	10.894450	10.003502	9.996498	44	56
5	15	9.102295	10.897705	9.105802	10.894198	10.003506	9.996494	45	55
6	30	9.102543	10.897457	9.106053	10.893947	10.003510	9.996490	30	54
7	45	9.102790	10.897210	9.106304	10.893696	10.003514	9.996486	15	53
8	17	9.103037	10.896963	9.106556	10.893444	10.003518	9.996482	43	52
9	15	9.103284	10.896716	9.106807	10.893193	10.003522	9.996478	45	51
10	30	9.103531	10.896469	9.107058	10.892942	10.003527	9.996473	30	50
11	45	9.103778	10.896222	9.107308	10.892692	10.003531	9.996469	15	49
12	18	9.104025	10.895975	9.107559	10.892441	10.003535	9.996465	42	48
13	15	9.104271	10.895729	9.107810	10.892190	10.003539	9.996461	45	47
14	30	9.104517	10.895483	9.108060	10.891940	10.003543	9.996457	30	46
15	45	9.104764	10.895236	9.108310	10.891690	10.003547	9.996453	15	45
16	19	9.105010	10.894990	9.108560	10.891440	10.003551	9.996449	41	44
17	15	9.105255	10.894745	9.108810	10.891190	10.003555	9.996445	45	43
18	30	9.105501	10.894499	9.109060	10.890940	10.003559	9.996441	30	42
19	45	9.105747	10.894253	9.109310	10.890690	10.003563	9.996437	15	41
20	20	9.105992	10.894008	9.109559	10.890441	10.003567	9.996433	40	40
21	15	9.106238	10.893762	9.109809	10.890191	10.003571	9.996429	45	39
22	30	9.106483	10.893517	9.110058	10.889942	10.003575	9.996425	30	38
23	45	9.106728	10.893272	9.110307	10.889693	10.003579	9.996421	15	37
24	21	9.106973	10.893027	9.110556	10.889444	10.003583	9.996417	39	36
25	15	9.107218	10.892782	9.110805	10.889195	10.003587	9.996413	45	35
26	30	9.107462	10.892538	9.111054	10.888946	10.003591	9.996409	30	34
27	45	9.107707	10.892293	9.111302	10.888698	10.003596	9.996404	15	33
28	22	9.107951	10.892049	9.111551	10.888449	10.003600	9.996400	38	32
29	15	9.108195	10.891805	9.111799	10.888201	10.003604	9.996396	45	31
30	30	9.108439	10.891561	9.112047	10.887953	10.003608	9.996392	30	30
31	45	9.108683	10.891317	9.112295	10.887705	10.003612	9.996388	15	29
32	23	9.108927	10.891073	9.112543	10.887457	10.003616	9.996384	37	28
33	15	9.109171	10.890829	9.112791	10.887209	10.003620	9.996380	45	27
34	30	9.109414	10.890586	9.113038	10.886962	10.003624	9.996376	30	26
35	45	9.109658	10.890342	9.113286	10.886714	10.003628	9.996372	15	25
36	24	9.109901	10.890099	9.113533	10.886467	10.003632	9.996368	36	24
37	15	9.110144	10.889856	9.113780	10.886220	10.003636	9.996364	45	23
38	30	9.110387	10.889613	9.114028	10.885972	10.003641	9.996359	30	22
39	45	9.110630	10.889370	9.114274	10.885726	10.003645	9.996355	15	21
40	25	9.110873	10.889127	9.114521	10.885479	10.003649	9.996351	35	20
41	15	9.111115	10.888885	9.114768	10.885232	10.003653	9.996347	45	19
42	30	9.111358	10.888642	9.115014	10.884986	10.003657	9.996343	30	18
43	45	9.111600	10.888400	9.115261	10.884739	10.003661	9.996339	15	17
44	26	9.111842	10.888158	9.115507	10.884493	10.003665	9.996335	34	16
45	15	9.112084	10.887916	9.115753	10.884247	10.003669	9.996331	45	15
46	30	9.112326	10.887674	9.115999	10.884001	10.003674	9.996326	30	14
47	45	9.112568	10.887432	9.116245	10.883755	10.003678	9.996322	15	13
48	27	9.112809	10.887191	9.116491	10.883509	10.003682	9.996318	33	12
49	15	9.113051	10.886949	9.116736	10.883264	10.003686	9.996314	45	11
50	30	9.113292	10.886708	9.116982	10.883018	10.003690	9.996310	30	10
51	45	9.113533	10.886467	9.117227	10.882773	10.003694	9.996306	15	9
52	28	9.113774	10.886226	9.117472	10.882528	10.003698	9.996302	32	8
53	15	9.114015	10.885985	9.117717	10.882283	10.003702	9.996298	45	7
54	30	9.114256	10.885744	9.117962	10.882038	10.003707	9.996293	30	6
55	45	9.114496	10.885504	9.118207	10.881793	10.003711	9.996289	15	5
56	29	9.114737	10.885263	9.118452	10.881548	10.003715	9.996285	31	4
57	15	9.114977	10.885023	9.118696	10.881304	10.003719	9.996281	45	3
58	30	9.115218	10.884782	9.118941	10.881059	10.003723	9.996277	30	2
59	45	9.115458	10.884542	9.119185	10.880815	10.003727	9.996273	15	1
60	30	9.115698	10.884302	9.119429	10.880571	10.003731	9.996269	30	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
5h 30m.			LOG SINES, &c.			82 deg.			

0h 30m.				LOG. SINES, &c.			7 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	30	9.115698	10.884302	9.119429	10.880571	10.003731	9.996269	30	60
1	15	9.115937	10.884063	9.119673	10.880327	10.003736	9.996264	45	59
2	30	9.116177	10.883823	9.119917	10.880083	10.003740	9.996260	30	58
3	45	9.116417	10.883583	9.120161	10.879839	10.003744	9.996256	15	57
4	31	9.116656	10.883344	9.120404	10.879596	10.003748	9.996252	29	56
5	15	9.116895	10.883105	9.120648	10.879352	10.003752	9.996248	45	55
6	30	9.117135	10.882865	9.120891	10.879109	10.003756	9.996244	30	54
7	45	9.117374	10.882626	9.121134	10.878866	10.003761	9.996239	15	53
8	32	9.117612	10.882388	9.121377	10.878623	10.003765	9.996235	28	52
9	15	9.117851	10.882149	9.121620	10.878380	10.003769	9.996231	45	51
10	30	9.118090	10.881910	9.121863	10.878137	10.003773	9.996227	30	50
11	45	9.118328	10.881672	9.122106	10.877894	10.003777	9.996223	15	49
12	33	9.118567	10.881433	9.122348	10.877652	10.003782	9.996218	27	48
13	15	9.118805	10.881195	9.122591	10.877409	10.003786	9.996214	45	47
14	30	9.119043	10.880957	9.122833	10.877167	10.003790	9.996210	30	46
15	45	9.119281	10.880719	9.123075	10.876925	10.003794	9.996206	15	45
16	34	9.119519	10.880481	9.123317	10.876683	10.003798	9.996202	26	44
17	15	9.119756	10.880244	9.123559	10.876441	10.003803	9.996197	45	43
18	30	9.119994	10.880006	9.123801	10.876199	10.003807	9.996193	30	42
19	45	9.120231	10.879769	9.124042	10.875958	10.003811	9.996189	15	41
20	35	9.120469	10.879531	9.124284	10.875716	10.003815	9.996185	25	40
21	15	9.120706	10.879294	9.124525	10.875475	10.003819	9.996181	45	39
22	30	9.120943	10.879057	9.124766	10.875234	10.003824	9.996176	30	38
23	45	9.121180	10.878820	9.125008	10.874992	10.003828	9.996172	15	37
24	36	9.121417	10.878583	9.125249	10.874751	10.003832	9.996168	24	36
25	15	9.121653	10.878347	9.125489	10.874511	10.003836	9.996164	45	35
26	30	9.121890	10.878110	9.125730	10.874270	10.003840	9.996160	30	34
27	45	9.122126	10.877874	9.125971	10.874029	10.003845	9.996155	15	33
28	37	9.122362	10.877638	9.126211	10.873789	10.003849	9.996151	23	32
29	15	9.122598	10.877402	9.126451	10.873549	10.003853	9.996147	45	31
30	30	9.122834	10.877166	9.126692	10.873308	10.003857	9.996143	30	30
31	45	9.123070	10.876930	9.126932	10.873068	10.003862	9.996138	15	29
32	38	9.123306	10.876694	9.127172	10.872828	10.003866	9.996134	22	28
33	15	9.123542	10.876458	9.127412	10.872588	10.003870	9.996130	45	27
34	30	9.123777	10.876223	9.127651	10.872349	10.003874	9.996126	30	26
35	45	9.124012	10.875988	9.127891	10.872109	10.003878	9.996122	15	25
36	39	9.124248	10.875752	9.128130	10.871870	10.003883	9.996117	21	24
37	15	9.124483	10.875517	9.128370	10.871630	10.003887	9.996113	45	23
38	30	9.124718	10.875282	9.128609	10.871391	10.003891	9.996109	30	22
39	45	9.124952	10.875048	9.128848	10.871152	10.003895	9.996105	15	21
40	40	9.125187	10.874813	9.129087	10.870913	10.003900	9.996100	20	20
41	15	9.125422	10.874578	9.129326	10.870674	10.003904	9.996096	45	19
42	30	9.125656	10.874344	9.129564	10.870436	10.003908	9.996092	30	18
43	45	9.125890	10.874110	9.129803	10.870197	10.003912	9.996088	15	17
44	41	9.126125	10.873875	9.130041	10.869959	10.003917	9.996083	19	16
45	15	9.126359	10.873641	9.130280	10.869720	10.003921	9.996079	45	15
46	30	9.126593	10.873407	9.130518	10.869482	10.003925	9.996075	30	14
47	45	9.126826	10.873174	9.130756	10.869244	10.003929	9.996071	15	13
48	42	9.127060	10.872940	9.130994	10.869006	10.003934	9.996066	18	12
49	15	9.127294	10.872706	9.131231	10.868769	10.003938	9.996062	45	11
50	30	9.127527	10.872473	9.131469	10.868531	10.003942	9.996058	30	10
51	45	9.127760	10.872240	9.131707	10.868293	10.003947	9.996053	15	9
52	43	9.127993	10.872007	9.131944	10.868056	10.003951	9.996049	17	8
53	15	9.128226	10.871774	9.132181	10.867819	10.003955	9.996045	45	7
54	30	9.128459	10.871541	9.132419	10.867581	10.003959	9.996041	30	6
55	45	9.128692	10.871308	9.132656	10.867344	10.003964	9.996036	15	5
56	44	9.128925	10.871075	9.132893	10.867107	10.003968	9.996032	16	4
57	15	9.129157	10.870843	9.133129	10.866871	10.003972	9.996028	45	3
58	30	9.129390	10.870610	9.133366	10.866634	10.003977	9.996023	30	2
59	45	9.129622	10.870378	9.133603	10.866397	10.003981	9.996019	15	1
60	45	9.129854	10.870146	9.133839	10.866161	10.003985	9.996015	15	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
5h 29m.				LOG. SINES, &c.			82 deg.		

0h 31m.				LOG. SINES, &c.			7 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	45	9.129854	10.870146	9.133839	10.866161	10.003985	9.996015	15	60
1	15	9.130086	10.869914	9.134075	10.865925	10.003989	9.996011	45	59
2	30	9.130318	10.869682	9.134311	10.865689	10.003994	9.996006	30	58
3	45	9.130550	10.869450	9.134548	10.865452	10.003998	9.996002	15	57
4	46	9.130781	10.869219	9.134783	10.865217	10.004002	9.995998	14	56
5	15	9.131013	10.868987	9.135019	10.864981	10.004007	9.995993	45	55
6	30	9.131244	10.868756	9.135255	10.864745	10.004011	9.995989	30	54
7	45	9.131475	10.868525	9.135491	10.864509	10.004015	9.995985	15	53
8	47	9.131706	10.868294	9.135726	10.864274	10.004020	9.995980	13	52
9	15	9.131937	10.868063	9.135961	10.864039	10.004024	9.995976	45	51
10	30	9.132168	10.867832	9.136196	10.863804	10.004028	9.995972	30	50
11	45	9.132399	10.867601	9.136432	10.863568	10.004033	9.995967	15	49
12	48	9.132630	10.867370	9.136666	10.863334	10.004037	9.995963	12	48
13	15	9.132860	10.867140	9.136901	10.863099	10.004041	9.995959	45	47
14	30	9.133091	10.866909	9.137136	10.862864	10.004046	9.995954	30	46
15	45	9.133321	10.866679	9.137371	10.862629	10.004050	9.995950	15	45
16	49	9.133551	10.866449	9.137605	10.862395	10.004054	9.995946	11	44
17	15	9.133781	10.866219	9.137839	10.862161	10.004059	9.995941	45	43
18	30	9.134011	10.865989	9.138074	10.861926	10.004063	9.995937	30	42
19	45	9.134241	10.865759	9.138308	10.861692	10.004067	9.995933	15	41
20	50	9.134470	10.865530	9.138542	10.861458	10.004072	9.995928	10	40
21	15	9.134700	10.865300	9.138776	10.861224	10.004076	9.995924	45	39
22	30	9.134929	10.865071	9.139009	10.860991	10.004080	9.995920	30	38
23	45	9.135158	10.864842	9.139243	10.860757	10.004085	9.995915	15	37
24	51	9.135387	10.864613	9.139476	10.860524	10.004089	9.995911	9	36
25	15	9.135616	10.864384	9.139710	10.860290	10.004093	9.995907	45	35
26	30	9.135845	10.864155	9.139943	10.860057	10.004098	9.995902	30	34
27	45	9.136074	10.863926	9.140176	10.859824	10.004102	9.995898	15	33
28	52	9.136303	10.863697	9.140409	10.859591	10.004106	9.995894	8	32
29	15	9.136531	10.863469	9.140642	10.859358	10.004111	9.995889	45	31
30	30	9.136760	10.863240	9.140875	10.859125	10.004115	9.995885	30	30
31	45	9.136988	10.863012	9.141107	10.858893	10.004120	9.995880	15	29
32	53	9.137216	10.862784	9.141340	10.858660	10.004124	9.995876	7	28
33	15	9.137444	10.862556	9.141572	10.858428	10.004128	9.995872	45	27
34	30	9.137672	10.862328	9.141805	10.858195	10.004133	9.995867	30	26
35	45	9.137900	10.862100	9.142037	10.857963	10.004137	9.995863	15	25
36	54	9.138127	10.861873	9.142269	10.857731	10.004141	9.995859	6	24
37	15	9.138355	10.861645	9.142501	10.857499	10.004146	9.995854	45	23
38	30	9.138582	10.861418	9.142733	10.857267	10.004150	9.995850	30	22
39	45	9.138810	10.861190	9.142964	10.857036	10.004155	9.995845	15	21
40	55	9.139037	10.860963	9.143196	10.856804	10.004159	9.995841	5	20
41	15	9.139264	10.860736	9.143427	10.856573	10.004163	9.995837	45	19
42	30	9.139491	10.860509	9.143659	10.856341	10.004168	9.995832	30	18
43	45	9.139718	10.860282	9.143890	10.856110	10.004172	9.995828	15	17
44	56	9.139944	10.860056	9.144121	10.855879	10.004177	9.995823	4	16
45	15	9.140171	10.859829	9.144352	10.855648	10.004181	9.995819	45	15
46	30	9.140397	10.859603	9.144583	10.855417	10.004185	9.995815	30	14
47	45	9.140624	10.859376	9.144814	10.855186	10.004190	9.995810	15	13
48	57	9.140850	10.859150	9.145044	10.854956	10.004194	9.995806	3	12
49	15	9.141076	10.858924	9.145275	10.854725	10.004199	9.995801	45	11
50	30	9.141302	10.858698	9.145505	10.854495	10.004203	9.995797	30	10
51	45	9.141528	10.858472	9.145735	10.854265	10.004207	9.995793	15	9
52	58	9.141754	10.858246	9.145965	10.854035	10.004212	9.995788	2	8
53	15	9.141979	10.858021	9.146195	10.853805	10.004216	9.995784	45	7
54	30	9.142205	10.857795	9.146425	10.853575	10.004221	9.995779	30	6
55	45	9.142430	10.857570	9.146655	10.853345	10.004225	9.995775	15	5
56	59	9.142655	10.857345	9.146885	10.853115	10.004230	9.995770	1	4
57	15	9.142881	10.857119	9.147114	10.852886	10.004234	9.995766	45	3
58	30	9.143106	10.856894	9 147344	10.852656	10.004238	9.995762	30	2
59	45	9.143330	10.856670	9.147573	10.852427	10.004243	9.995757	15	1
60	60	9.143555	10.856445	9.147802	10.852198	10.004247	9.995753	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
5h 28m.				LOG. SINES, &c.			82 deg.		

0h 32m.		LOG. SINES, &c.					8 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	0	9.143555	10.856445	9.147802	10.852198	10.004247	9.995753	60	60
1	15	9.143780	10.856220	9.148032	10.851968	10.004252	9.995748	45	59
2	30	9.144004	10.855996	9.148261	10.851739	10.004256	9.995744	30	58
3	45	9.144229	10.855771	9.148489	10.851511	10.004261	9.995739	15	57
4	1	9.144453	10.855547	9.148718	10.851282	10.004265	9.995735	59	56
5	15	9.144677	10.855323	9.148947	10.851053	10.004269	9.995731	45	55
6	30	9.144901	10.855099	9.149175	10.850825	10.004274	9.995726	30	54
7	45	9.145125	10.854875	9.149404	10.850596	10.004278	9.995722	15	53
8	2	9.145349	10.854651	9.149632	10.850368	10.004283	9.995717	58	52
9	15	9.145573	10.854427	9.149860	10.850140	10.004287	9.995713	45	51
10	30	9.145797	10.854203	9.150088	10.849912	10.004292	9.995708	30	50
11	45	9.146020	10.853980	9.150316	10.849684	10.004296	9.995704	15	49
12	3	9.146243	10.853757	9.150544	10.849456	10.004301	9.995699	57	48
13	15	9.146467	10.853533	9.150772	10.849228	10.004305	9.995695	45	47
14	30	9.146690	10.853310	9.150999	10.849001	10.004310	9.995690	30	46
15	45	9.146913	10.853087	9.151227	10.848773	10.004314	9.995686	15	45
16	4	9.147136	10.852864	9.151454	10.848546	10.004319	9.995681	56	44
17	15	9.147359	10.852641	9.151682	10.848318	10.004323	9.995677	45	43
18	30	9.147581	10.852419	9.151909	10.848091	10.004328	9.995672	30	42
19	45	9.147804	10.852196	9.152136	10.847864	10.004332	9.995668	15	41
20	5	9.148026	10.851974	9.152363	10.847637	10.004337	9.995663	55	40
21	15	9.148248	10.851752	9.152589	10.847411	10.004341	9.995659	45	39
22	30	9.148471	10.851529	9.152816	10.847184	10.004345	9.995655	30	38
23	45	9.148693	10.851307	9.153043	10.846957	10.004350	9.995650	15	37
24	6	9.148915	10.851085	9.153269	10.846731	10.004354	9.995646	54	36
25	15	9.149137	10.850863	9.153496	10.846504	10.004359	9.995641	45	35
26	30	9.149358	10.850642	9.153722	10.846278	10.004363	9.995637	30	34
27	45	9.149580	10.850420	9.153948	10.846052	10.004368	9.995632	15	33
28	7	9.149801	10.850199	9.154174	10.845826	10.004372	9.995628	53	32
29	15	9.150023	10.849977	9.154400	10.845600	10.004377	9.995623	45	31
30	30	9.150244	10.849756	9.154626	10.845374	10.004381	9.995619	30	30
31	45	9.150465	10.849535	9.154851	10.845149	10.004386	9.995614	15	29
32	8	9.150686	10.849314	9.155077	10.844923	10.004391	9.995609	52	28
33	15	9.150907	10.849093	9.155302	10.844698	10.004395	9.995605	45	27
34	30	9.151128	10.848872	9.155528	10.844472	10.004400	9.995600	30	26
35	45	9.151349	10.848651	9.155753	10.844247	10.004404	9.995596	15	25
36	9	9.151569	10.848431	9.155978	10.844022	10.004409	9.995591	51	24
37	15	9.151790	10.848210	9.156203	10.843797	10.004413	9.995587	45	23
38	30	9.152010	10.847990	9.156428	10.843572	10.004418	9.995582	30	22
39	45	9.152230	10.847770	9.156653	10.843347	10.004422	9.995578	15	21
40	10	9.152451	10.847549	9.156877	10.843123	10.004427	9.995573	50	20
41	15	9.152671	10.847329	9.157102	10.842898	10.004431	9.995569	45	19
42	30	9.152891	10.847109	9.157326	10.842674	10.004436	9.995564	30	18
43	45	9.153110	10.846890	9.157551	10.842449	10.004440	9.995560	15	17
44	11	9.153330	10.846670	9.157775	10.842225	10.004445	9.995555	49	16
45	15	9.153550	10.846450	9.157999	10.842001	10.004449	9.995551	45	15
46	30	9.153769	10.846231	9.158223	10.841777	10.004454	9.995546	30	14
47	45	9.153988	10.846012	9.158447	10.841553	10.004458	9.995542	15	13
48	12	9.154208	10.845792	9.158671	10.841329	10.004463	9.995537	48	12
49	15	9.154427	10.845573	9.158894	10.841106	10.004468	9.995532	45	11
50	30	9.154646	10.845354	9.159118	10.840882	10.004472	9.995528	30	10
51	45	9.154865	10.845135	9.159341	10.840659	10.004477	9.995523	15	9
52	13	9.155083	10.844917	9.159565	10.840435	10.004481	9.995519	47	8
53	15	9.155302	10.844698	9.159788	10.840212	10.004486	9.995514	45	7
54	30	9.155521	10.844479	9.160011	10.839989	10.004490	9.995510	30	6
55	45	9.155739	10.844261	9.160234	10.839766	10.004495	9.995505	15	5
56	14	9.155957	10.844043	9.160457	10.839543	10.004500	9.995500	46	4
57	15	9.156176	10.843824	9.160680	10.839320	10.004504	9.995496	45	3
58	30	9.156394	10.843606	9.160902	10.839098	10.004509	9.995491	30	2
59	45	9.156612	10.843388	9.161125	10.838875	10.004513	9.995487	15	1
60	15	9.156830	10.843170	9.161347	10.838653	10.004518	9.995482	45	0
sec.	′ ″	cosine.	secant.	cotangent	tangent.	cosecant.	sine	″ ′	sec.
5h 27m.		LOG. SINES, &c.					81 deg.		

0h 33m.			LOG. SINES, &c.				8 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	15	9.156830	10.843170	9.161347	10.838653	10.004518	9.995482	45	60
1	15	9.157047	10.842953	9.161570	10.838430	10.004522	9.995478	45	59
2	30	9.157265	10.842735	9.161792	10.838208	10.004527	9.995473	30	58
3	45	9.157482	10.842518	9.162014	10.837986	10.004532	9.995468	15	57
4	16	9.157700	10.842300	9.162236	10.837764	10.004536	9.995464	44	56
5	15	9.157917	10.842083	9.162458	10.837542	10.004541	9.995459	45	55
6	30	9.158134	10.841866	9.162680	10.837320	10.004545	9.995455	30	54
7	45	9.158352	10.841648	9.162901	10.837099	10.004550	9.995450	15	53
8	17	9.158569	10.841431	9.163123	10.836877	10.004555	9.995445	43	52
9	15	9.158785	10.841215	9.163344	10.836656	10.004559	9.995441	45	51
10	30	9.159002	10.840998	9.163566	10.836434	10.004564	9.995436	30	50
11	45	9.159219	10.840781	9.163787	10.836213	10.004568	9.995432	15	49
12	18	9.159435	10.840565	9.164008	10.835992	10.004573	9.995427	42	48
13	15	9.159652	10.840348	9.164229	10.835771	10.004578	9.995422	45	47
14	30	9.159868	10.840132	9.164450	10.835550	10.004582	9.995418	30	46
15	45	9.160084	10.839916	9.164671	10.835329	10.004587	9.995413	15	45
16	19	9.160300	10.839700	9.164892	10.835108	10.004591	9.995409	41	44
17	15	9.160516	10.839484	9.165112	10.834888	10.004596	9.995404	45	43
18	30	9.160732	10.839268	9.165333	10.834667	10.004601	9.995399	30	42
19	45	9.160948	10.839052	9.165553	10.834447	10.004605	9.995395	15	41
20	20	9.161164	10.838836	9.165774	10.834226	10.004610	9.995390	40	40
21	15	9.161379	10.838621	9.165994	10.834006	10.004614	9.995386	45	39
22	30	9.161595	10.838405	9.166214	10.833786	10.004619	9.995381	30	38
23	45	9.161810	10.838190	9.166434	10.833566	10.004624	9.995376	15	37
24	21	9.162025	10.837975	9.166654	10.833346	10.004628	9.995372	39	36
25	15	9.162241	10.837759	9.166873	10.833127	10.004633	9.995367	45	35
26	30	9.162456	10.837544	9.167093	10.832907	10.004638	9.995362	30	34
27	45	9.162670	10.837330	9.167313	10.832687	10.004642	9.995358	15	33
28	22	9.162885	10.837115	9.167532	10.832468	10.004647	9.995353	38	32
29	15	9.163100	10.836900	9.167751	10.832249	10.004652	9.995348	45	31
30	30	9.163315	10.836685	9.167971	10.832029	10.004656	9.995344	30	30
31	45	9.163529	10.836471	9.168190	10.831810	10.004661	9.995339	15	29
32	23	9.163743	10.836257	9.168409	10.831591	10.004666	9.995334	37	28
33	15	9.163958	10.836042	9.168628	10.831372	10.004670	9.995330	45	27
34	30	9.164172	10.835828	9.168847	10.831153	10.004675	9.995325	30	26
35	45	9.164386	10.835614	9.169065	10.830935	10.004680	9.995320	15	25
36	24	9.164600	10.835400	9.169284	10.830716	10.004684	9.995316	36	24
37	15	9.164814	10.835186	9.169502	10.830498	10.004689	9.995311	45	23
38	30	9.165027	10.834973	9.169721	10.830279	10.004694	9.995306	30	22
39	45	9.165241	10.834759	9.169939	10.830061	10.004698	9.995302	15	21
40	25	9.165454	10.834546	9.170157	10.829843	10.004703	9.995297	35	20
41	15	9.165668	10.834332	9.170375	10.829625	10.004708	9.995292	45	19
42	30	9.165881	10.834119	9.170593	10.829407	10.004712	9.995288	30	18
43	45	9.166094	10.833906	9.170811	10.829189	10.004717	9.995283	15	17
44	26	9.166307	10.833693	9.171029	10.828971	10.004722	9.995278	34	16
45	15	9.166520	10.833480	9.171246	10.828754	10.004726	9.995274	45	15
46	30	9.166733	10.833267	9.171464	10.828536	10.004731	9.995269	30	14
47	45	9.166946	10.833054	9.171681	10.828319	10.004736	9.995264	15	13
48	27	9.167159	10.832841	9.171899	10.828101	10.004740	9.995260	33	12
49	15	9.167371	10.832629	9.172116	10.827884	10.004745	9.995255	45	11
50	30	9.167584	10.832416	9.172333	10.827667	10.004750	9.995250	30	10
51	45	9.167796	10.832204	9.172550	10.827450	10.004754	9.995246	15	9
52	28	9 168008	10.831992	9.172767	10.827233	10.004759	9.995241	32	8
53	15	9 168220	10.831780	9.172984	10.827016	10.004764	9.995236	45	7
54	30	9.168432	10.831568	9.173201	10.826799	10.004769	9.995231	30	6
55	45	9.168644	10.831356	9.173417	10.826583	10.004773	9.995227	15	5
56	29	9.168856	10.831144	9.173634	10.826366	10.004778	9.995222	31	4
57	15	9.169068	10.830932	9.173850	10.826150	10.004783	9.995217	45	3
58	30	9.169279	10.830721	9.174066	10.825934	10.004787	9.995213	30	2
59	45	9.169491	10.830509	9.174283	10.825717	10.004792	9.995208	15	1
60	30	9.169702	10.830298	9.174499	10.825501	10.004797	9.995203	30	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
5h 26m.			LOG. SINES, &c.				81 deg.		

sec.	′ ″	sine.	cosecant.	tangent	cotangent.	secant.	cosine.	″ ′	sec.
	$0^h\ 34^m$.		LOG. SINES, &c.					8 deg.	
0	30	9.169702	10.830298	9.174499	10.825501	10.004797	9.995203	30	60
1	15	9.169913	10.830087	9.174715	10.825285	10.004802	9.995198	45	59
2	30	9.170124	10.829876	9.174931	10.825069	10.004806	9.995194	30	58
3	45	9.170336	10.829664	9.175146	10.824854	10.004811	9.995189	15	57
4	31	9.170546	10.829454	9.175362	10.824638	10.004816	9.995184	29	56
5	15	9.170757	10.829243	9.175578	10.824422	10.004820	9.995180	45	55
6	30	9.170968	10.829032	9.175793	10.824207	10.004825	9.995175	30	54
7	45	9.171179	10.828821	9.176009	10.823991	10.004830	9.995170	15	53
8	32	9.171389	10.828611	9.176224	10.823776	10.004835	9.995165	28	52
9	15	9.171600	10.828400	9.176439	10.823561	10.004839	9.995161	45	51
10	30	9.171810	10.828190	9.176654	10.823346	10.004844	9.995156	30	50
11	45	9.172020	10.827980	9.176869	10.823131	10.004849	9.995151	15	49
12	33	9.172230	10.827770	9.177084	10.822916	10.004854	9.995146	27	48
13	15	9.172440	10.827560	9.177299	10.822701	10.004858	9.995142	45	47
14	30	9.172650	10.827350	9.177513	10.822487	10.004863	9.995137	30	46
15	45	9.172860	10.827140	9.177728	10.822272	10.004868	9.995132	15	45
16	34	9.173070	10.826930	9.177942	10.822058	10.004873	9.995127	26	44
17	15	9.173279	10.826721	9.178157	10.821843	10.004877	9.995123	45	43
18	30	9.173489	10.826511	9.178371	10.821629	10.004882	9.995118	30	42
19	45	9.173698	10.826302	9.178585	10.821415	10.004887	9.995113	15	41
20	35	9.173908	10.826092	9.178799	10.821201	10.004892	9.995108	25	40
21	15	9.174117	10.825883	9.179013	10.820987	10.004896	9.995104	45	39
22	30	9.174326	10.825674	9.179227	10.820773	10.004901	9.995099	30	38
23	45	9.174535	10.825465	9.179441	10.820559	10.004906	9.995094	15	37
24	36	9.174744	10.825256	9.179655	10.820345	10.004911	9.995089	24	36
25	15	9.174953	10.825047	9.179868	10.820132	10.004916	9.995084	45	35
26	30	9.175161	10.824839	9.180082	10.819918	10.004920	9.995080	30	34
27	45	9.175370	10.824630	9.180295	10.819705	10.004925	9.995075	15	33
28	37	9.175578	10.824422	9.180508	10.819492	10.004930	9.995070	23	32
29	15	9.175787	10.824213	9.180721	10.819279	10.004935	9.995065	45	31
30	30	9.175995	10.824005	9.180934	10.819066	10.004939	9.995061	30	30
31	45	9.176203	10.823797	9.181147	10.818853	10.004944	9.995056	15	29
32	38	9.176411	10.823589	9.181360	10.818640	10.004949	9.995051	22	28
33	15	9.176619	10.823381	9.181573	10.818427	10.004954	9.995046	45	27
34	30	9.176827	10.823173	9.181786	10.818214	10.004959	9.995041	30	26
35	45	9.177035	10.822965	9.181998	10.818002	10.004963	9.995037	15	25
36	39	9.177242	10.822758	9.182211	10.817789	10.004968	9.995032	21	24
37	15	9.177450	10.822550	9.182423	10.817577	10.004973	9.995027	45	23
38	30	9.177657	10.822343	9.182635	10.817365	10.004978	9.995022	30	22
39	45	9.177865	10.822135	9.182847	10.817153	10.004983	9.995017	15	21
40	40	9.178072	10.821928	9.183059	10.816941	10.004987	9.995013	20	20
41	15	9.178279	10.821721	9.183271	10.816729	10.004992	9.995008	45	19
42	30	9.178486	10.821514	9.183483	10.816517	10.004997	9.995003	30	18
43	45	9.178693	10.821307	9.183695	10.816305	10.005002	9.994998	15	17
44	41	9.178900	10.821100	9.183907	10.816093	10.005007	9.994993	19	16
45	15	9.179107	10.820893	9.184118	10.815882	10.005012	9.994988	45	15
46	30	9.179313	10.820687	9.184330	10.815670	10.005016	9.994984	30	14
47	45	9.179520	10.820480	9.184541	10.815459	10.005021	9.994979	15	13
48	42	9.179726	10.820274	9.184752	10.815248	10.005026	9.994974	18	12
49	15	9.179933	10.820067	9.184964	10.815036	10.005031	9.994969	45	11
50	30	9.180139	10.819861	9.185175	10.814825	10.005036	9.994964	30	10
51	45	9.180345	10.819655	9.185386	10.814614	10.005041	9.994959	15	9
52	43	9.180551	10.819449	9.185597	10.814403	10.005045	9.994955	17	8
53	15	9.180757	10.819243	9.185807	10.814193	10.005050	9.994950	45	7
54	30	9.180963	10.819037	9.186018	10.813982	10.005055	9.994945	30	6
55	45	9.181169	10.818831	9.186229	10.813771	10.005060	9.994940	15	5
56	44	9.181374	10.818626	9.186439	10.813561	10.005065	9.994935	16	4
57	15	9.181580	10.818420	9.186649	10.813351	10.005070	9.994930	45	3
58	30	9.181785	10.818215	9.186860	10.813140	10.005075	9.994925	30	2
59	45	9.181991	10.818009	9.187070	10.812930	10.005079	9.994921	15	1
60	45	9.182196	10.817804	9.187280	10.812720	10.005084	9.994916	15	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$5^h\ 25^m$.		LOG. SINES, &c.					81 deg.	

0h 35m.			LOG. SINES, &c.				8 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	45	9.182196	10.817804	9.187280	10.812720	10.005084	9.994916	15	60
1	15	9.182401	10.817599	9.187490	10.812510	10.005089	9.994911	45	59
2	30	9.182606	10.817394	9.187700	10.812300	10.005094	9.994906	30	58
3	45	9.182811	10.817189	9.187910	10.812090	10.005099	9.994901	15	57
4	46	9.183016	10.816984	9.188120	10.811880	10.005104	9.994896	14	56
5	15	9.183221	10.816779	9.188329	10.811671	10.005109	9.994891	45	55
6	30	9.183425	10.816575	9.188539	10.811461	10.005113	9.994887	30	54
7	45	9.183630	10.816370	9.188748	10.811252	10.005118	9.994882	15	53
8	47	9.183834	10.816166	9.188957	10.811043	10.005123	9.994877	13	52
9	15	9.184039	10.815961	9.189167	10.810833	10.005128	9.994872	45	51
10	30	9.184243	10.815757	9.189376	10.810624	10.005133	9.994867	30	50
11	45	9.184447	10.815553	9.189585	10.810415	10.005138	9.994862	15	49
12	48	9.184651	10.815349	9.189794	10.810206	10.005143	9.994857	12	48
13	15	9.184855	10.815145	9.190003	10.809997	10.005148	9.994852	45	47
14	30	9.185059	10.814941	9.190211	10.809789	10.005153	9.994847	30	46
15	45	9.185263	10.814737	9.190420	10.809580	10.005157	9.994843	15	45
16	49	9.185466	10.814534	9.190629	10.809371	10.005162	9.994838	11	44
17	15	9.185670	10.814330	9.190837	10.809163	10.005167	9.994833	45	43
18	30	9.185873	10.814127	9.191046	10.808954	10.005172	9.994828	30	42
19	45	9.186077	10.813923	9.191254	10.808746	10.005177	9.994823	15	41
20	50	9.186280	10.813720	9.191462	10.808538	10.005182	9.994818	10	40
21	15	9.186483	10.813517	9.191670	10.808330	10.005187	9.994813	45	39
22	30	9.186686	10.813314	9.191878	10.808122	10.005192	9.994808	30	38
23	45	9.186889	10.813111	9.192086	10.807914	10.005197	9.994803	15	37
24	51	9.187092	10.812908	9.192294	10.807706	10.005202	9.994798	9	36
25	15	9.187295	10.812705	9.192502	10.807498	10.005206	9.994794	45	35
26	30	9.187498	10.812502	9.192709	10.807291	10.005211	9.994789	30	34
27	45	9.187700	10.812300	9.192917	10.807083	10.005216	9.994784	15	33
28	52	9.187903	10.812097	9.193124	10.806876	10.005221	9.994779	8	32
29	15	9.188105	10.811895	9.193331	10.806669	10.005226	9.994774	45	31
30	30	9.188308	10.811692	9.193539	10.806461	10.005231	9.994769	30	30
31	45	9.188510	10.811490	9.193746	10.806254	10.005236	9.994764	15	29
32	53	9.188712	10.811288	9.193953	10.806047	10.005241	9.994759	7	28
33	15	9.188914	10.811086	9.194160	10.805840	10.005246	9.994754	45	27
34	30	9.189116	10.810884	9.194367	10.805633	10.005251	9.994749	30	26
35	45	9.189318	10.810682	9.194573	10.805427	10.005256	9.994744	15	25
36	54	9.189519	10.810481	9.194780	10.805220	10.005261	9.994739	6	24
37	15	9.189721	10.810279	9.194987	10.805013	10.005266	9.994734	45	23
38	30	9.189923	10.810077	9.195193	10.804807	10.005271	9.994729	30	22
39	45	9.190124	10.809876	9.195400	10.804600	10.005276	9.994724	15	21
40	55	9.190325	10.809675	9.195606	10.804394	10.005281	9.994719	5	20
41	15	9.190527	10.809473	9.195812	10.804188	10.005286	9.994714	45	19
42	30	9.190728	10.809272	9.196018	10.803982	10.005290	9.994710	30	18
43	45	9.190929	10.809071	9.196224	10.803776	10.005295	9.994705	15	17
44	56	9.191130	10.808870	9.196430	10.803570	10.005300	9.994700	4	16
45	15	9.191331	10.808669	9.196636	10.803364	10.005305	9.994695	45	15
46	30	9.191531	10.808469	9.196842	10.803158	10.005310	9.994690	30	14
47	45	9.191732	10.808268	9.197047	10.802953	10.005315	9.994685	15	13
48	57	9.191933	10.808067	9.197253	10.802747	10.005320	9.994680	3	12
49	15	9.192133	10.807867	9.197458	10.802542	10.005325	9.994675	45	11
50	30	9.192334	10.807666	9.197664	10.802336	10.005330	9.994670	30	10
51	45	9.192534	10.807466	9.197869	10.802131	10.005335	9.994665	15	9
52	58	9.192734	10.807266	9.198074	10.801926	10.005340	9.994660	2	8
53	15	9.192934	10.807066	9.198279	10.801721	10.005345	9.994655	45	7
54	30	9.193134	10.806866	9.198484	10.801516	10.005350	9.994650	30	6
55	45	9.193334	10.806666	9.198689	10.801311	10.005355	9.994645	15	5
56	59	9.193534	10.806466	9.198894	10.801106	10.005360	9.994640	1	4
57	15	9.193734	10.806266	9.199099	10.800901	10.005365	9.994635	45	3
58	30	9.193933	10.806067	9.199303	10.800697	10.005370	9.994630	30	2
59	45	9.194133	10.805867	9.199508	10.800492	10.005375	9.994625	15	1
60	60	9.194332	10.805668	9.199712	10.800288	10.005380	9.994620	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
5h 24m.			LOG. SINES, &c.				81 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	0h 36m.		LOG. SINES, &c.				9 deg.		
0	0	9.194332	10.805668	9.199712	10.800288	10.005380	9.994620	60	60
1	15	9.194532	10.805468	9.199917	10.800083	10.005385	9.994615	45	59
2	30	9.194731	10.805269	9.200121	10.799879	10.005390	9.994610	30	58
3	45	9.194930	10.805070	9.200325	10.799675	10.005395	9.994605	15	57
4	1	9.195129	10.804871	9.200529	10.799471	10.005400	9.994600	59	56
5	15	9.195328	10.804672	9.200733	10.799267	10.005405	9.994595	45	55
6	30	9.195527	10.804473	9.200937	10.799063	10.005410	9.994590	30	54
7	45	9.195726	10.804274	9.201141	10.798859	10.005415	9.994585	15	53
8	2	9.195925	10.804075	9.201345	10.798655	10.005420	9.994580	58	52
9	15	9.196123	10.803877	9.201548	10.798452	10.005425	9.994575	45	51
10	30	9.196322	10.803678	9.201752	10.798248	10.005430	9.994570	30	50
11	45	9.196520	10.803480	9.201955	10.798045	10.005435	9.994565	15	49
12	3	9.196719	10.803281	9.202159	10.797841	10.005440	9.994560	57	48
13	15	9.196917	10.803083	9.202362	10.797638	10.005445	9.994555	45	47
14	30	9.197115	10.802885	9.202565	10.797435	10.005450	9.994550	30	46
15	45	9.197313	10.802687	9.202768	10.797232	10.005455	9.994545	15	45
16	4	9.197511	10.802489	9.202971	10.797029	10.005460	9.994540	56	44
17	15	9.197709	10.802291	9.203174	10.796826	10.005466	9.994534	45	43
18	30	9.197907	10.802093	9.203377	10.796623	10.005471	9.994529	30	42
19	45	9.198104	10.801896	9.203580	10.796420	10.005476	9.994524	15	41
20	5	9.198302	10.801698	9.203782	10.796218	10.005481	9.994519	55	40
21	15	9.198499	10.801501	9.203985	10.796015	10.005486	9.994514	45	39
22	30	9.198697	10.801303	9.204187	10.795813	10.005491	9.994509	30	38
23	45	9.198894	10.801106	9.204390	10.795610	10.005496	9.994504	15	37
24	6	9.199091	10.800909	9.204592	10.795408	10.005501	9.994499	54	36
25	15	9.199288	10.800712	9.204794	10.795206	10.005506	9.994494	45	35
26	30	9.199485	10.800515	9.204996	10.795004	10.005511	9.994489	30	34
27	45	9.199682	10.800318	9.205198	10.794802	10.005516	9.994484	15	33
28	7	9.199879	10.800121	9.205400	10.794600	10.005521	9.994479	53	32
29	15	9.200076	10.799924	9.205602	10.794398	10.005526	9.994474	45	31
30	30	9.200273	10.799727	9.205804	10.794196	10.005531	9.994469	30	30
31	45	9.200469	10.799531	9.206006	10.793994	10.005536	9.994464	15	29
32	8	9.200666	10.799334	9.206207	10.793793	10.005541	9.994459	52	28
33	15	9.200862	10.799138	9.206409	10.793591	10.005546	9.994454	45	27
34	30	9.201059	10.798941	9.206610	10.793390	10.005552	9.994448	30	26
35	45	9.201255	10.798745	9.206811	10.793189	10.005557	9.994443	15	25
36	9	9.201451	10.793549	9.207013	10.792987	10.005562	9.994438	51	24
37	15	9.201647	10.798353	9.207214	10.792786	10.005567	9.994433	45	23
38	30	9.201843	10.798157	9.207415	10.792585	10.005572	9.994428	30	22
39	45	9.202039	10.797961	9.207616	10.792384	10.005577	9.994423	15	21
40	10	9.202234	10.797766	9.207816	10.792184	10.005582	9.994418	50	20
41	15	9.202430	10.797570	9.208017	10.791983	10.005587	9.994413	45	19
42	30	9.202626	10.797374	9.208218	10.791782	10.005592	9.994408	30	18
43	45	9.202821	10.797179	9.208419	10.791581	10.005597	9.994403	15	17
44	11	9.203017	10.796983	9.208619	10.791381	10.005603	9.994397	49	16
45	15	9.203212	10.796788	9.208819	10.791181	10.005608	9.994392	45	15
46	30	9.203407	10.796593	9.209020	10.790980	10.005613	9.994387	30	14
47	45	9.203602	10.796398	9.209220	10.790780	10.005618	9.994382	15	13
48	12	9.203797	10.796203	9.209420	10.790580	10.005623	9.994377	48	12
49	15	9.203992	10.796008	9.209620	10.790380	10.005628	9.994372	45	11
50	30	9.204187	10.795813	9.209820	10.790180	10.005633	9.994367	30	10
51	45	9.204382	10.795618	9.210020	10.789980	10.005638	9.994362	15	9
52	13	9.204577	10.795423	9.210220	10.789780	10.005643	9.994357	47	8
53	15	9.204771	10.795229	9.210420	10.789580	10.005649	9.994351	45	7
54	30	9.204966	10.795034	9.210619	10.789381	10.005654	9.994346	30	6
55	45	9.205160	10.794840	9.210819	10.789181	10.005659	9.994341	15	5
56	14	9.205354	10.794646	9.211018	10.788982	10.005664	9.994336	46	4
57	15	9.205549	10.794451	9.211218	10.788782	10.005669	9.994331	45	3
58	30	9.205743	10.794257	9.211417	10.788583	10 005674	9.994326	30	2
59	45	9.205937	10.794063	9.211616	10.788384	10.005679	9.994321	15	1
60	15	9.206131	10.793869	9.211815	10.788185	10.005684	9.994316	45	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″	sec.
	5h 23m.		LOG. SINES, &c.				80 deg.		

0h 37m.			LOG. SINES, &c.				9 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	15	9.206131	10.793869	9.211815	10.788185	10.005684	9.994316	45	60
1	15	9.206325	10.793675	9.212014	10.787986	10.005690	9.994310	45	59
2	30	9.206519	10.793481	9.212213	10.787787	10.005695	9.994305	30	58
3	45	9.206712	10.793288	9.212412	10.787588	10.005700	9.994300	15	57
4	16	9.206906	10.793094	9.212611	10.787389	10.005705	9.994295	44	56
5	15	9.207099	10.792901	9.212810	10.787190	10.005710	9.994290	45	55
6	30	9.207293	10.792707	9.213008	10.786992	10.005715	9.994285	30	54
7	45	9.207486	10.792514	9.213207	10.786793	10.005721	9.994279	15	53
8	17	9.207679	10.792321	9.213405	10.786595	10.005726	9.994274	43	52
9	15	9.207873	10.792127	9.213603	10.786397	10.005731	9.994269	45	51
10	30	9.208066	10.791934	9.213802	10.786198	10.005736	9.994264	30	50
11	45	9.208259	10.791741	9.214000	10.786000	10.005741	9.994259	15	49
12	18	9.208452	10.791548	9.214198	10.785802	10.005746	9.994254	42	48
13	15	9.208644	10.791356	9.214396	10.785604	10.005752	9.994248	45	47
14	30	9.208837	10.791163	9.214594	10.785406	10.005757	9.994243	30	46
15	45	9.209030	10.790970	9.214792	10.785208	10.005762	9.994238	15	45
16	19	9.209222	10.790778	9.214989	10.785011	10.005767	9.994233	41	44
17	15	9.209415	10.790585	9.215187	10.784813	10.005772	9.994228	45	43
18	30	9.209607	10.790393	9.215385	10.784615	10.005777	9.994223	30	42
19	45	9.209799	10.790201	9.215582	10.784418	10.005783	9.994217	15	41
20	20	9.209992	10.790008	9.215779	10.784221	10.005788	9.994212	40	40
21	15	9.210184	10.789816	9.215977	10.784023	10.005793	9.994207	45	39
22	30	9.210376	10.789624	9.216174	10.783826	10.005798	9.994202	30	38
23	45	9.210568	10.789432	9.216371	10.783629	10.005803	9.994197	15	37
24	21	9.210760	10.789240	9.216568	10.783432	10.005809	9.994191	39	36
25	15	9.210951	10.789049	9.216765	10.783235	10.005814	9.994186	45	35
26	30	9.211143	10.788857	9.216962	10.783038	10.005819	9.994181	30	34
27	45	9.211335	10.788665	9.217159	10.782841	10.005824	9.994176	15	33
28	22	9.211526	10.788474	9.217356	10.782644	10.005829	9.994171	38	32
29	15	9.211718	10.788282	9.217552	10.782448	10.005835	9.994165	45	31
30	30	9.211909	10.788091	9.217749	10.782251	10 005840	9.994160	30	30
31	45	9.212100	10.787900	9.217945	10.782055	10.005845	9.994155	15	29
32	23	9.212291	10.787709	9.218142	10.781858	10.005850	9.994150	37	28
33	15	9.212482	10.787518	9.218338	10.781662	10.005856	9.994144	45	27
34	30	9.212673	10.787327	9.218534	10.781466	10.005861	9.994139	30	26
35	45	9.212864	10.787136	9.218730	10.781270	10.005866	9.994134	15	25
36	24	9.213055	10.786945	9.218926	10.781074	10.005871	9.994129	36	24
37	15	9.213246	10.786754	9.219122	10.780878	10.005876	9.994124	45	23
38	30	9.213437	10.786563	9.219318	10.780682	10.005882	9.994118	30	22
39	45	9.213627	10.786373	9.219514	10.780486	10.005887	9.994113	15	21
40	25	9.213818	10.786182	9.219710	10.780290	10.005892	9.994108	35	20
41	15	9.214008	10.785992	9.219905	10.780095	10.005897	9.994103	45	19
42	30	9.214198	10.785802	9.220101	10.779899	10.005903	9.994097	30	18
43	45	9.214389	10.785611	9.220296	10.779704	10.005908	9.994092	15	17
44	26	9.214579	10.785421	9.220492	10.779508	10.005913	9.994087	34	16
45	15	9.214769	10.785231	9.220687	10.779313	10.005918	9.994082	45	15
46	30	9.214959	10.785041	9.220882	10.779118	10.005924	9.994076	30	14
47	45	9.215149	10.784851	9.221077	10.778923	10.005929	9.994071	15	13
48	27	9.215338	10.784662	9.221272	10.778728	10.005934	9.994066	33	12
49	15	9.215528	10.784472	9.221467	10.778533	10.005939	9.994061	45	11
50	30	9.215718	10.784282	9.221662	10.778338	10.005945	9.994055	30	10
51	45	9.215907	10.784093	9.221857	10.778143	10.005950	9.994050	15	9
52	28	9.216097	10.783903	9.222052	10.777948	10.005955	9.994045	32	8
53	15	9.216286	10.783714	9.222246	10.777754	10.005960	9.994040	45	7
54	30	9.216475	10.783525	9.222441	10.777559	10.005966	9.994034	30	6
55	45	9.216664	10.783336	9.222635	10.777365	10.005971	9.994029	15	5
56	29	9.216854	10.783146	9.222830	10.777170	10.005976	9.994024	31	4
57	15	9.217043	10.782957	9.223024	10.776976	10.005982	9.994018	45	3
58	30	9.217232	10.782768	9.223218	10.776782	10.005987	9.994013	30	2
59	45	9.217420	10.782580	9.223412	10.776588	10.005992	9.994008	15	1
60	30	9.217609	10.782391	9.223606	10.776394	10.005997	9.994003	30	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
5h 22m.			LOG. SINES, &c.				80 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	′ ″	sec.
	$0^h\ 38^m$.		LOG. SINES, &C.				9 deg.		
0	30	9.217609	10.782391	9.223606	10.776394	10.005997	9.994003	30	60
1	15	9.217798	10.782202	9.223800	10.776200	10.006003	9.993997	45	59
2	30	9.217986	10.782014	9.223994	10.776006	10.006008	9.993992	30	58
3	45	9.218175	10.781825	9.224188	10.775812	10.006013	9.993987	15	57
4	31	9.218363	10.781637	9.224382	10.775618	10.006019	9.993981	29	56
5	15	9.218552	10.781448	9.224576	10.775424	10.006024	9.993976	45	55
6	30	9.218740	10.781260	9.224769	10.775231	10 006029	9.993971	30	54
7	45	9.218928	10.781072	9.224963	10.775037	10.006034	9.993966	15	53
8	32	9.219116	10.780884	9.225156	10.774844	10.006040	9.993960	28	52
9	15	9.219304	10.780696	9.225349	10.774651	10.006045	9.993955	45	51
10	30	9.219492	10.780508	9.225543	10.774457	10.006050	9.993950	30	50
11	45	9.219680	10.780320	9.225736	10.774264	10.006056	9.993944	15	49
12	33	9.219868	10.780132	9.225929	10.774071	10.006061	9.993939	27	48
13	15	9.220056	10.779944	9.226122	10.773878	10.006066	9.993934	45	47
14	30	9.220243	10.779757	9.226315	10.773685	10.006072	9.993928	30	46
15	45	9.220431	10.779569	9.226508	10.773492	10.006077	9.993923	15	45
16	34	9.220618	10.779382	9.226700	10.773300	10.006082	9.993918	26	44
17	15	9.220805	10.779195	9.226893	10.773107	10.006088	9.993912	45	43
18	30	9.220993	10.779007	9.227086	10.772914	10.006093	9.993907	30	42
19	45	9.221180	10.778820	9.227278	10.772722	10.006098	9.993902	15	41
20	35	9.221367	10.778633	9.227471	10.772529	10.006104	9.993896	25	40
21	15	9.221554	10.778446	9.227663	10.772337	10.006109	9.993891	45	39
22	30	9.221741	10.778259	9.227855	10.772145	10.006114	9.993886	30	38
23	45	9.221928	10.778072	9.228047	10.771953	10.006120	9.993880	15	37
24	36	9.222115	10.777885	9.228239	10.771761	10.006125	9.993875	24	36
25	15	9.222301	10.777699	9.228431	10.771569	10.006130	9.993870	45	35
26	30	9.222488	10.777512	9.228623	10.771377	10.006136	9.993864	30	34
27	45	9.222674	10.777326	9.228815	10.771185	10.006141	9.993859	15	33
28	37	9.222861	10.777139	9.229007	10.770993	10.006146	9.993854	23	32
29	15	9.223047	10.776953	9.229199	10.770801	10.006152	9.993848	45	31
30	30	9.223234	10.776766	9.229390	10.770610	10.006157	9.993843	30	30
31	45	9.223420	10.776580	9.229582	10.770418	10.006162	9.993838	15	29
32	38	9.223606	10.776394	9.229773	10.770227	10.006168	9.993832	22	28
33	15	9.223792	10.776208	9.229965	10.770035	10.006173	9.993827	45	27
34	30	9.223978	10.776022	9.230156	10.769844	10.006178	9.993822	30	26
35	45	9.224164	10.775836	9.230347	10.769653	10.006184	9.993816	15	25
36	39	9.224349	10.775651	9.230539	10.769461	10.006189	9.993811	21	24
37	15	9.224535	10.775465	9.230730	10.769270	10.006195	9.993805	45	23
38	30	9.224721	10.775279	9.230921	10.769079	10.006200	9.993800	30	22
39	45	9.224906	10.775094	9.231112	10.768888	10.006205	9.993795	15	21
40	40	9.225092	10.774908	9.231302	10.768698	10.006211	9.993789	20	20
41	15	9.225277	10.774723	9.231493	10.768507	10.006216	9.993784	45	19
42	30	9.225462	10.774538	9.231684	10.768316	10.006221	9.993779	30	18
43	45	9.225648	10.774352	9.231874	10.768126	10.006227	9.993773	15	17
44	41	9.225833	10.774167	9.232065	10.767935	10.006232	9.993768	19	16
45	15	9.226018	10.773982	9.232255	10.767745	10.006238	9.993762	45	15
46	30	9.226203	10.773797	9.232446	10.767554	10.006243	9.993757	30	14
47	45	9.226388	10.773612	9.232636	10.767364	10.006248	9.993752	15	13
48	42	9.226572	10.773428	9.232826	10.767174	10.006254	9.993746	18	12
49	15	9.226757	10.773243	9.233016	10.766984	10.006259	9.993741	45	11
50	30	9.226942	10.773058	9.233206	10.766794	10.006265	9.993735	30	10
51	45	9.227126	10.772874	9.233396	10.766604	10.006270	9.993730	15	9
52	43	9.227311	10.772689	9.233586	10.766414	10.006275	9.993725	17	8
53	15	9.227495	10.772505	9.233776	10.766224	10.006281	9.993719	45	7
54	30	9.227680	10.772320	9.233966	10.766034	10.006286	9.993714	30	6
55	45	9.227864	10.772136	9.234155	10.765845	10.006292	9.993708	15	5
56	44	9.228048	10.771952	9.234345	10.765655	10.006297	9.993703	16	4
57	15	9.228232	10.771768	9.234535	10.765465	10.006302	9.993698	45	3
58	30	9.228416	10.771584	9.234724	10.765276	10.006308	9.993692	30	2
59	45	9.228600	10.771400	9.234913	10.765087	10.006313	9.993687	15	1
60	45	9.228784	10.771216	9.235103	10.764897	10.006319	9.993681	15	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$5^h\ 21^m$.		LOG. SINES, &c.				80 deg.		

0h 39m.			LOG. SINES, &c.				9 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	′	sec.
0	45	9.228784	10.771216	9.235103	10.764897	10.006319	9.993681	15	60
1	15	9.228968	10.771032	9.235292	10.764708	10.006324	9.993676	45	59
2	30	9.229151	10.770849	9.235481	10.764519	10.006330	9.993670	30	58
3	45	9.229335	10.770665	9.235670	10.764330	10.006335	9.993665	15	57
4	46	9.229518	10.770482	9.235859	10.764141	10.006340	9.993660	14	56
5	15	9.229702	10.770298	9.236048	10.763952	10.006346	9.993654	45	55
6	30	9.229885	10.770115	9.236237	10.763763	10.006351	9.993649	30	54
7	45	9.230069	10.769931	9.236425	10.763575	10.006357	9.993643	15	53
8	47	9.230252	10.769748	9.236614	10.763386	10.006362	9.993638	13	52
9	15	9.230435	10.769565	9.236802	10.763198	10.006368	9.993632	45	51
10	30	9.230618	10.769382	9.236991	10.763009	10.006373	9.993627	30	50
11	45	9.230801	10.769199	9.237179	10.762821	10.006379	9.993621	15	49
12	48	9.230984	10.769016	9.237368	10.762632	10.006384	9.993616	12	48
13	15	9.231167	10.768833	9.237556	10.762444	10.006389	9.993611	45	47
14	30	9.231349	10.768651	9.237744	10.762256	10.006395	9.993605	30	46
15	45	9.231532	10.768468	9.237932	10.762068	10.006400	9.993600	15	45
16	49	9.231714	10.768286	9.238120	10.761880	10.006406	9.993594	11	44
17	15	9.231897	10.768103	9.238308	10.761692	10.006411	9.993589	45	43
18	30	9.232079	10.767921	9.238496	10.761504	10.006417	9.993583	30	42
19	45	9.232262	10.767738	9.238684	10.761316	10.006422	9.993578	15	41
20	50	9.232444	10.767556	9.238872	10.761128	10.006428	9.993572	10	40
21	15	9.232626	10.767374	9.239059	10.760941	10.006433	9.993567	45	39
22	30	9.232808	10.767192	9.239247	10.760753	10.006439	9.993561	30	38
23	45	9.232990	10.767010	9.239434	10.760566	10.006444	9.993556	15	37
24	51	9.233172	10.766828	9.239622	10.760378	10.006450	9.993550	9	36
25	15	9.233354	10.766646	9.239809	10.760191	10.006455	9.993545	45	35
26	30	9.233536	10.766464	9.239996	10.760004	10.006461	9.993539	30	34
27	45	9.233718	10.766282	9.240184	10.759816	10.006466	9.993534	15	33
28	52	9.233899	10.766101	9.240371	10.759629	10.006472	9.993528	8	32
29	15	9.234081	10.765919	9.240558	10.759442	10.006477	9.993523	45	31
30	30	9.234262	10.765738	9.240745	10.759255	10.006483	9.993517	30	30
31	45	9.234444	10.765556	9.240932	10.759068	10.006488	9.993512	15	29
32	53	9.234625	10.765375	9.241118	10.758882	10.006494	9.993506	7	28
33	15	9.234806	10.765194	9.241305	10.758695	10.006499	9.993501	45	27
34	30	9.234987	10.765013	9.241492	10.758508	10.006505	9.993495	30	26
35	45	9.235168	10.764832	9.241678	10.758322	10.006510	9.993490	15	25
36	54	9.235349	10.764651	9.241865	10.758135	10.006516	9.993484	6	24
37	15	9.235530	10.764470	9.242051	10.757949	10.006521	9.993479	45	23
38	30	9.235711	10.764289	9.242238	10.757762	10.006527	9.993473	30	22
39	45	9.235892	10.764108	9.242424	10.757576	10.006532	9.993468	15	21
40	55	9.236073	10.763927	9.242610	10.757390	10.006538	9.993462	5	20
41	15	9.236253	10.763747	9.242796	10.757204	10.006543	9.993457	45	19
42	30	9.236434	10.763566	9.242982	10.757018	10.006549	9.993451	30	18
43	45	9.236614	10.763386	9.243168	10.756832	10.006554	9.993446	15	17
44	56	9.236795	10.763205	9.243354	10.756646	10.006560	9.993440	4	16
45	15	9.236975	10.763025	9.243540	10.756460	10.006565	9.993435	45	15
46	30	9.237155	10.762845	9.243726	10.756274	10.006571	9.993429	30	14
47	45	9.237335	10.762665	9.243912	10.756088	10.006576	9.993424	15	13
48	57	9.237515	10.762485	9.244097	10.755903	10.006582	9.993418	3	12
49	15	9.237695	10.762305	9.244283	10.755717	10.006587	9.993413	45	11
50	30	9.237875	10.762125	9.244468	10.755532	10.006593	9.993407	30	10
51	45	9.238055	10.761945	9.244654	10.755346	10.006599	9.993401	15	9
52	58	9.238235	10.761765	9.244839	10.755161	10.006604	9.993396	2	8
53	15	9.238415	10.761585	9.245024	10.754976	10.006610	9.993390	45	7
54	30	9.238594	10.761406	9.245209	10.754791	10.006615	9.993385	30	6
55	45	9.238774	10.761226	9.245394	10.754606	10.006621	9.993379	15	5
56	59	9.238953	10.761047	9.245579	10.754421	10.006626	9.993374	1	4
57	15	9.239132	10.760868	9.245764	10.754236	10.006632	9.993368	45	3
58	30	9.239312	10.760688	9.245949	10.754051	10.006637	9.993363	30	2
59	45	9.239491	10.760509	9.246134	10.753866	10.006643	9.993357	15	1
60	60	9.239670	10.760330	9.246319	10.753681	10.006649	9.993351	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	′	sec.
5h 20m.			LOG. SINES, &c.				80 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
		$0^h\ 40^m$.		LOG. SINES, &c.			10 deg		
0	0	9.239670	10.760330	9.246319	10.753681	10.006649	9.993351	60	60
1	15	9.239849	10.760151	9.246503	10.753497	10.006654	9.993346	45	59
2	30	9.240028	10.759972	9.246688	10.753312	10.006660	9.993340	30	58
3	45	9.240207	10.759793	9.246872	10.753128	10.006665	9.993335	15	57
4	1	9.240386	10.759614	9.247057	10.752943	10.006671	9.993329	59	56
5	15	9.240565	10.759435	9.247241	10.752759	10.006676	9.993324	45	55
6	30	9.240744	10.759256	9.247425	10.752575	10.006682	9.993318	30	54
7	45	9.240922	10.759078	9.247610	10.752390	10.006688	9.993312	15	53
8	2	9.241101	10.758899	9.247794	10.752206	10.006693	9.993307	58	52
9	15	9.241279	10.758721	9.247978	10.752022	10.006699	9.993301	45	51
10	30	9.241458	10.758542	9.248162	10.751838	10.006704	9.993296	30	50
11	45	9.241636	10.758364	9.248346	10.751654	10.006710	9.993290	15	49
12	3	9.241814	10.758186	9.248530	10.751470	10.006716	9.993284	57	48
13	15	9.241992	10.758008	9.248713	10.751287	10.006721	9.993279	45	47
14	30	9.242170	10.757830	9.248897	10.751103	10.006727	9.993273	30	46
15	45	9.242348	10.757652	9.249081	10.750919	10.006732	9.993268	15	45
16	4	9.242526	10.757474	9.249264	10.750736	10.006738	9.993262	56	44
17	15	9.242704	10.757296	9.249448	10.750552	10.006744	9.993256	45	43
18	30	9.242882	10.757118	9.249631	10.750369	10.006749	9.993251	30	42
19	45	9.243060	10.756940	9.249814	10.750186	10.006755	9.993245	15	41
20	5	9.243237	10.756763	9.249998	10.750002	10.006760	9.993240	55	40
21	15	9.243415	10.756585	9.250181	10.749819	10.006766	9.993234	45	39
22	30	9.243592	10.756408	9.250364	10.749636	10.006772	9.993228	30	38
23	45	9.243770	10.756230	9.250547	10.749453	10.006777	9.993223	15	37
24	6	9.243947	10.756053	9.250730	10.749270	10.006783	9.993217	54	36
25	15	9.244124	10.755876	9.250913	10.749087	10.006789	9.993211	45	35
26	30	9.244302	10.755698	9.251096	10.748904	10.006794	9.993206	30	34
27	45	9.244479	10.755521	9.251278	10.748722	10.006800	9.993200	15	33
28	7	9.244656	10.755344	9.251461	10.748539	10.006805	9.993195	53	32
29	15	9.244833	10.755167	9.251644	10.748356	10.006811	9.993189	45	31
30	30	9.245010	10.754990	9.251826	10.748174	10.006817	9.993183	30	30
31	45	9.245186	10.754814	9.252009	10.747991	10.006822	9.993178	15	29
32	8	9.245363	10.754637	9.252191	10.747809	10.006828	9.993172	52	28
33	15	9.245540	10.754460	9.252373	10.747627	10.006834	9.993166	45	27
34	30	9.245716	10.754284	9.252556	10.747444	10.006839	9.993161	30	26
35	45	9.245893	10.754107	9.252738	10.747262	10.006845	9.993155	15	25
36	9	9.246069	10.753931	9.252920	10.747080	10.006851	9.993149	51	24
37	15	9.246246	10.753754	9.253102	10.746898	10.006856	9.993144	45	23
38	30	9.246422	10.753578	9.253284	10.746716	10.006862	9.993138	30	22
39	45	9.246598	10.753402	9.253466	10.746534	10.006868	9.993132	15	21
40	10	9.246775	10.753225	9.253648	10.746352	10.006873	9.993127	50	20
41	15	9.246951	10.753049	9.253829	10.746171	10.006879	9.993121	45	19
42	30	9.247127	10.752873	9.254011	10.745989	10.006885	9.993115	30	18
43	45	9.247303	10.752697	9.254193	10.745807	10.006890	9.993110	15	17
44	11	9.247478	10.752522	9.254374	10.745626	10.006896	9.993104	49	16
45	15	9.247654	10.752346	9.254556	10.745444	10.006902	9.993098	45	15
46	30	9.247830	10.752170	9.254737	10.745263	10.006907	9.993093	30	14
47	45	9.248006	10.751994	9.254918	10.745082	10.006913	9.993087	15	13
48	12	9.248181	10.751819	9.255100	10.744900	10.006919	9.993081	48	12
49	15	9.248357	10.751643	9.255281	10.744719	10.006924	9.993076	45	11
50	30	9.248532	10.751468	9.255462	10.744538	10.006930	9.993070	30	10
51	45	9.248707	10.751293	9.255643	10.744357	10.006936	9.993064	15	9
52	13	9.248883	10.751117	9.255824	10.744176	10.006941	9.993059	47	8
53	15	9.249058	10.750942	9.256005	10.743995	10.006947	9.993053	45	7
54	30	9.249233	10.750767	9.256186	10.743814	10.006953	9.993047	30	6
55	45	9.249408	10.750592	9.256366	10.743634	10.006958	9.993042	15	5
56	14	9.249583	10.750417	9.256547	10.743453	10.006964	9.993036	46	4
57	15	9.249758	10.750242	9.256728	10.743272	10.006970	9.993030	45	3
58	30	9.249933	10.750067	9.256908	10.743092	10.006976	9.993024	30	2
59	45	9.250107	10.749893	9.257089	10.742911	10.006981	9.993019	15	1
60	15	9.250282	10.749718	9.257269	10.742731	10.006987	9.993013	45	0
sec.	′ ″	cosine.	secant.	cotangent	tangent.	cosecant.	sine	″ ′	sec.
		$5^h\ 19^m$.		LOG. SINES, &c.			79 deg.		

0h 41m.			LOG. SINES, &c.			10 deg.			
sec.	′ ″	sine.	cosecant	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	15	9.250282	10.749718	9.257269	10.742731	10.006987	9.993013	45	60
1	15	9.250457	10.749543	9.257449	10.742551	10.006993	9.993067	45	59
2	30	9.250631	10.749369	9.257630	10.742370	10.006998	9.993002	30	58
3	45	9.250806	10.749194	9.257810	10.742190	10.007004	9.992996	15	57
4	16	9.250980	10.749020	9.257990	10.742010	10.007010	9.992990	44	56
5	15	9.251155	10.748845	9.258170	10.741830	10.007016	9.992984	45	55
6	30	9.251329	10.748671	9.258350	10.741650	10.007021	9.992979	30	54
7	45	9.251503	10.748497	9.258530	10.741470	10.007027	9.992973	15	53
8	17	9.251677	10 748323	9.258710	10.741290	10.007033	9.992967	43	52
9	15	9.251851	10.748149	9.258890	10.741110	10.007038	9.992962	45	51
10	30	9.252025	10.747975	9.259069	10.740931	10.007044	9.992956	30	50
11	45	9.252199	10.747801	9.259249	10.740751	10.007050	9.992950	15	49
12	18	9.252373	10.747627	9.259428	10.740572	10.007056	9.992944	42	48
13	15	9.252547	10.747453	9.259608	10.740392	10.007061	9.992939	45	47
14	30	9.252720	10.747280	9.259787	10.740213	10.007067	9.992933	30	46
15	45	9.252894	10.747106	9.259967	10.740033	10.007073	9.992927	15	45
16	19	9.253067	10.746933	9.260146	10.739854	10.007079	9.992921	41	44
17	15	9.253241	10.746759	9.260325	10.739675	10.007084	9.992916	45	43
18	30	9.253414	10.746586	9.260504	10.739496	10.007090	9.992910	30	42
19	45	9.253588	10.746412	9.260683	10.739317	10.007096	9.992904	15	41
20	20	9.253761	10.746239	9.260862	10.739138	10.007102	9.992898	40	40
21	15	9.253934	10.746066	9.261041	10.738959	10.007107	9.992893	45	39
22	30	9.254107	10.745893	9.261220	10.738780	10.007113	9.992887	30	38
23	45	9.254280	10.745720	9.261399	10.738601	10.007119	9.992881	15	37
24	21	9.254453	10.745547	9.261578	10.738422	10.007125	9.992875	39	36
25	15	9.254626	10.745374	9.261757	10.738243	10.007131	9.992869	45	35
26	30	9.254799	10.745201	9.261935	10.738065	10.007136	9.992864	30	34
27	45	9.254972	10.745028	9.262114	10.737886	10.007142	9.992858	15	33
28	22	9.255144	10.744856	9.262292	10.737708	10.007148	9.992852	38	32
29	15	9.255317	10.744683	9.262470	10.737530	10.007154	9.992846	45	31
30	30	9.255489	10.744511	9.262649	10.737351	10 007159	9.992841	30	30
31	45	9.255662	10.744338	9.262827	10.737173	10.007165	9.992835	15	29
32	23	9.255834	10 744166	9.263005	10.736995	10.007171	9.992829	37	28
33	15	9.256007	10.743993	9.263183	10.736817	10.007177	9.992823	45	27
34	30	9.256179	10.743821	9.263361	10.736639	10.007183	9.992817	30	26
35	45	9.256351	10.743649	9.263539	10.736461	10.007188	9.992812	15	25
36	24	9.256523	10.743477	9.263717	10.736283	10.007194	9.992806	36	24
37	15	9.256695	10.743305	9.263895	10.736105	10.007200	9.992800	45	23
38	30	9.256867	10.743133	9.264073	10.735927	10.007206	9.992794	30	22
39	45	9.257039	10.742961	9.264251	10.735749	10.007212	9.992788	15	21
40	25	9.257211	10.742789	9.264428	10.735572	10.007217	9.992783	35	20
41	15	9.257383	10.742617	9.264606	10.735394	10.007223	9.992777	45	19
42	30	9.257554	10.742446	9.264783	10.735217	10.007229	9.992771	30	18
43	45	9.257726	10.742274	9.264961	10.735039	10.007235	9.992765	15	17
44	26	9.257898	10.742102	9 265138	10.734862	10.007241	9.992759	34	16
45	15	9.258069	10.741931	9.265315	10.734685	10.007246	9.992754	45	15
46	30	9.258241	10.741759	9.265493	10.734507	10.007252	9.992748	30	14
47	45	9.258412	10.741588	9.265670	10.734330	10.007258	9.992742	15	13
48	27	9.258583	10.741417	9.265847	10.734153	10.007264	9.992736	33	12
49	15	9.258754	10.741246	9.266024	10.733976	10.007270	9.992730	45	11
50	30	9.258925	10.741075	9.266201	10.733799	10.007276	9.992724	30	10
51	45	9.259097	10.740903	9.266378	10.733622	10.007281	9.992719	15	9
52	28	9.259268	10.740732	9.266555	10.733445	10.007287	9.992713	32	8
53	15	9.259438	10.740562	9.266731	10.733269	10.007293	9.992707	45	7
54	30	9.259609	10.740391	9.266908	10.733092	10.007299	9.992701	30	6
55	45	9.259780	10.740220	9.267085	10.732915	10.007305	9.992695	15	5
56	29	9.259951	10.740049	9.267261	10.732739	10.007311	9.992689	31	4
57	15	9.260121	10.739879	9.267438	10.732562	10.007316	9.992684	45	3
58	30	9.260292	10.739708	9.267614	10.732386	10.007322	9.992678	30	2
59	45	9 260463	10.739537	9.267791	10.732209	10.007328	9.992672	15	1
60	30	9.260633	10.739367	9.267967	10.732033	10.007334	9.992666	30	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
5h 19m.			LOG. SINES, &c.			79 deg.			

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	$0^h\ 42^m$.		LOG. SINES, &c.				10 deg.		
0	30	9.260633	10.739367	9.267967	10.732033	10.007334	9.992666	30	60
1	15	9.260803	10.739197	9.268143	10.731857	10.007340	9.992660	45	59
2	30	9.260974	10.739026	9.268319	10.731681	10.007346	9.992654	30	58
3	45	9.261144	10.738856	9.268495	10.731505	10.007351	9.992649	15	57
4	31	9.261314	10.738686	9.268671	10.731329	10.007357	9.992643	29	56
5	15	9.261484	10.738516	9.268847	10.731153	10.007363	9.992637	45	55
6	30	9.261654	10.738346	9.269023	10.730977	10.007369	9.992631	30	54
7	45	9.261824	10.738176	9.269199	10.730801	10.007375	9.992625	15	53
8	32	9.261994	10.738006	9.269375	10.730625	10.007381	9.992619	28	52
9	15	9.262164	10.737836	9.269551	10.730449	10.007387	9.992613	45	51
10	30	9.262334	10.737666	9.269726	10.730274	10.007393	9.992607	30	50
11	45	9.262503	10.737497	9.269902	10.730098	10.007398	9.992602	15	49
12	33	9.262673	10.737327	9.270077	10.729923	10.007404	9.992596	27	48
13	15	9.262842	10.737158	9.270253	10.729747	10.007410	9.992590	45	47
14	30	9.263012	10.736988	9.270428	10.729572	10.007416	9.992584	30	46
15	45	9.263181	10.736819	9.270603	10.729397	10.007422	9.992578	15	45
16	34	9.263351	10.736649	9.270779	10.729221	10.007428	9.992572	26	44
17	15	9.263520	10.736480	9.270954	10.729046	10.007434	9.992566	45	43
18	30	9.263689	10.736311	9.271129	10.728871	10.007440	9.992560	30	42
19	45	9.263858	10.736142	9.271304	10.728696	10.007446	9.992554	15	41
20	35	9.264027	10.735973	9.271479	10.728521	10.007451	9.992549	25	40
21	15	9.264196	10.735804	9.271654	10.728346	10.007457	9.992543	45	39
22	30	9.264365	10.735635	9.271829	10.728171	10.007463	9.992537	30	38
23	45	9.264534	10.735466	9.272003	10.727997	10.007469	9.992531	15	37
24	36	9.264703	10.735297	9.272178	10.727822	10.007475	9.992525	24	36
25	15	9.264872	10.735128	9.272353	10.727647	10.007481	9.992519	45	35
26	30	9.265040	10.734960	9.272527	10.727473	10.007487	9.992513	30	34
27	45	9.265209	10.734791	9.272702	10.727298	10.007493	9.992507	15	33
28	37	9.265377	10.734623	9.272876	10.727124	10.007499	9.992501	23	32
29	15	9.265546	10.734454	9.273051	10.726949	10.007505	9.992495	45	31
30	30	9.265714	10.734286	9.273225	10.726775	10.007511	9.992489	30	30
31	45	9.265883	10.734117	9.273399	10.726601	10.007517	9.992483	15	29
32	38	9.266051	10.733949	9.273573	10.726427	10.007522	9.992478	22	28
33	15	9.266219	10.733781	9.273747	10.726253	10.007528	9.992472	45	27
34	30	9.266387	10.733613	9.273921	10.726079	10.007534	9.992466	30	26
35	45	9.266555	10.733445	9.274095	10.725905	10.007540	9.992460	15	25
36	39	9.266723	10.733277	9.274269	10.725731	10.007546	9.992454	21	24
37	15	9.266891	10.733109	9.274443	10.725557	10.007552	9.992448	45	23
38	30	9.267059	10.732941	9.274617	10.725383	10.007558	9.992442	30	22
39	45	9.267227	10.732773	9.274791	10.725209	10.007564	9.992436	15	21
40	40	9.267394	10.732606	9.274964	10.725036	10.007570	9.992430	20	20
41	15	9.267562	10.732438	9.275138	10.724862	10.007576	9.992424	45	19
42	30	9.267730	10.732270	9.275312	10.724688	10.007582	9.992418	30	18
43	45	9.267897	10.732103	9.275485	10.724515	10.007588	9.992412	15	17
44	41	9.268065	10.731935	9.275658	10.724342	10.007594	9.992406	19	16
45	15	9.268232	10.731768	9.275832	10.724168	10.007600	9.992400	45	15
46	30	9.268399	10.731601	9.276005	10.723995	10.007606	9.992394	30	14
47	45	9.268567	10.731433	9.276178	10.723822	10.007612	9.992388	15	13
48	42	9.268734	10.731266	9.276351	10.723649	10.007618	9.992382	18	12
49	15	9.268901	10.731099	9.276524	10.723476	10.007624	9.992376	45	11
50	30	9.269068	10.730932	9.276697	10.723303	10.007630	9.992370	30	10
51	45	9.269235	10.730765	9.276870	10.723130	10.007636	9.992364	15	9
52	43	9.269402	10.730598	9.277043	10.722957	10.007642	9.992358	17	8
53	15	9.269569	10.730431	9.277216	10.722784	10.007648	9.992352	45	7
54	30	9.269735	10.730265	9.277389	10.722611	10.007653	9.992347	30	6
55	45	9.269902	10.730098	9.277562	10.722438	10.007659	9.992341	15	5
56	44	9.270069	10.729931	9.277734	10.722266	10.007665	9.992335	16	4
57	15	9.270235	10.729765	9.277907	10.722093	10.007671	9.992329	45	3
58	30	9.270402	10.729598	9.278079	10.721921	10.007677	9.992323	30	2
59	45	9.270568	10.729432	9.278252	10.721748	10.007683	9.992317	15	1
60	45	9.270735	10.729265	9.278424	10.721576	10.007689	9.992311	15	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$5^h\ 17^m$.		LOG. SINES, &c.				79 deg.		

0h 43m.			LOG. SINES, &c.				10 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	45	9.270735	10.729265	9.278424	10.721576	10.007689	9.992311	15	60
1	15	9.270901	10.729099	9.278596	10.721404	10.007695	9.992305	45	59
2	30	9.271067	10.728933	9.278769	10.721231	10.007701	9.992299	30	58
3	45	9.271234	10.728766	9.278941	10.721059	10.007707	9.992293	15	57
4	46	9.271400	10.728600	9.279113	10.720887	10.007713	9.992287	14	56
5	15	9.271566	10.728434	9.279285	10.720715	10.007719	9.992281	45	55
6	30	9.271732	10.728268	9.279457	10.720543	10.007725	9.992275	30	54
7	45	9.271898	10.728102	9.279629	10.720371	10.007731	9.992269	15	53
8	47	9.272063	10.727937	9.279801	10.720199	10.007737	9.992263	13	52
9	15	9.272229	10.727771	9.279973	10.720027	10.007743	9.992257	45	51
10	30	9.272395	10.727605	9.280144	10.719856	10.007749	9.992251	30	50
11	45	9.272561	10.727439	9.280316	10.719684	10.007756	9.992244	15	49
12	48	9.272726	10.727274	9.280488	10.719512	10.007762	9.992238	12	48
13	15	9.272892	10.727108	9.280659	10.719341	10.007768	9.992232	45	47
14	30	9.273057	10.726943	9.280831	10.719169	10.007774	9.992226	30	46
15	45	9.273223	10.726777	9.281002	10.718998	10.007780	9.992220	15	45
16	49	9.273388	10.726612	9.281174	10.718826	10.007786	9.992214	11	44
17	15	9.273553	10.726447	9.281345	10.718655	10.007792	9.992208	45	43
18	30	9.273718	10.726282	9.281516	10.718484	10.007798	9.992202	30	42
19	45	9.273884	10.726116	9.281687	10.718313	10.007804	9.992196	15	41
20	50	9.274049	10.725951	9.281858	10.718142	10.007810	9.992190	10	40
21	15	9.274214	10.725786	9.282029	10.717971	10.007816	9.992184	45	39
22	30	9.274379	10.725621	9.282200	10.717800	10.007822	9.992178	30	38
23	45	9.274543	10.725457	9.282371	10.717629	10.007828	9.992172	15	37
24	51	9.274708	10.725292	9.282542	10.717458	10.007834	9.992166	9	36
25	15	9.274873	10.725127	9.282713	10.717287	10.007840	9.992160	45	35
26	30	9.275038	10.724962	9.282884	10.717116	10.007846	9.992154	30	34
27	45	9.275202	10.724798	9.283054	10.716946	10.007852	9.992148	15	33
28	52	9.275367	10.724633	9.283225	10.716775	10.007858	9.992142	8	32
29	15	9.275531	10.724469	9.283396	10.716604	10.007864	9.992136	45	31
30	30	9.275696	10.724304	9.283566	10.716434	10.007870	9.992130	30	30
31	45	9.275860	10.724140	9.283737	10.716263	10.007876	9.992124	15	29
32	53	9.276024	10.723976	9.283907	10.716093	10.007883	9.992117	7	28
33	15	9.276189	10.723811	9.284077	10.715923	10.007889	9.992111	45	27
34	30	9.276353	10.723647	9.284247	10.715753	10.007895	9.992105	30	26
35	45	9.276517	10.723483	9.284418	10.715582	10.007901	9.992099	15	25
36	54	9.276681	10.723319	9.284588	10.715412	10.007907	9.992093	6	24
37	15	9.276845	10.723155	9.284758	10.715242	10.007913	9.992087	45	23
38	30	9.277009	10.722991	9.284928	10.715072	10.007919	9.992081	30	22
39	45	9.277173	10.722827	9.285098	10.714902	10.007925	9.992075	15	21
40	55	9.277337	10.722663	9.285268	10.714732	10.007931	9.992069	5	20
41	15	9.277500	10.722500	9.285437	10.714563	10.007937	9.992063	45	19
42	30	9.277664	10.722336	9.285607	10.714393	10.007943	9 992057	30	18
43	45	9.277827	10.722173	9.285777	10.714223	10.007949	9.992051	15	17
44	56	9.277991	10.722009	9.285947	10.714053	10.007956	9.992044	4	16
45	15	9.278154	10.721846	9.286116	10.713884	10.007962	9.992038	45	15
46	30	9.278318	10.721682	9.286286	10.713714	10.007968	9.992032	30	14
47	45	9.278481	10.721519	9.286455	10.713545	10.007974	9.992026	15	13
48	57	9.278644	10.721356	9.286624	10.713376	10.007980	9.992020	3	12
49	15	9.278808	10.721192	9.286794	10.713206	10.007986	9.992014	45	11
50	30	9.278971	10.721029	9.286963	10.713037	10.007992	9.992008	30	10
51	45	9.279134	10.720866	9.287132	10.712868	10.007998	9.992002	15	9
52	58	9.279297	10.720703	9.287301	10.712699	10.008004	9.991996	2	8
53	15	9.279460	10.720540	9.287470	10.712530	10.008011	9.991989	45	7
54	30	9.279623	10.720377	9.287639	10.712361	10.008017	9.991983	30	6
55	45	9.279786	10.720214	9.287808	10.712192	10.008023	9.991977	15	5
56	59	9.279948	10.720052	9.287977	10.712023	10.008029	9.991971	1	4
57	15	9.280111	10.719889	9.288146	10.711854	10.008035	9.991965	45	3
58	30	9.280274	10.719726	9.288315	10.711685	10.008041	9.991959	30	2
59	45	9.280436	10.719564	9.288484	10.711516	10.008047	9.991953	15	1
60	60	9.280599	10.719401	9.288652	10.711348	10.008053	9.991947	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
5h 16m.			LOG. SINES, &c.				79 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	$0^h\ 44^m$.		LOG. SINES, &c.				11 deg.		
0	0	9.280599	10.719401	9.288652	10.711348	10.008053	9.991947	60	60
1	15	9.280761	10.719239	9.288821	10.711179	10.008060	9.991940	45	59
2	30	9.280924	10.719076	9.288989	10.711011	10.008066	9.991934	30	58
3	45	9.281086	10.718914	9.289158	10.710842	10.008072	9.991928	15	57
4	1	9.281248	10.718752	9.289326	10.710674	10.008078	9.991922	59	56
5	15	9.281410	10.718590	9.289495	10.710505	10.008084	9.991916	45	55
6	30	9.281573	10.718427	9.289663	10.710337	10.008090	9.991910	30	54
7	45	9.281735	10.718265	9.289831	10.710169	10.008097	9.991903	15	53
8	2	9.281897	10.718103	9.289999	10.710001	10.008103	9.991897	58	52
9	15	9.282059	10.717941	9.290167	10.709833	10.008109	9.991891	45	51
10	30	9.282220	10.717780	9.290335	10.709665	10.008115	9.991885	30	50
11	45	9.282382	10.717618	9.290503	10.709497	10.008121	9.991879	15	49
12	3	9.282544	10.717456	9.290671	10.709329	10.008127	9.991873	57	48
13	15	9.282706	10.717294	9.290839	10.709161	10.008133	9.991867	45	47
14	30	9.282867	10.717133	9.291007	10.708993	10.008140	9.991860	30	46
15	45	9.283029	10.716971	9.291175	10.708825	10.008146	9.991854	15	45
16	4	9.283190	10.716810	9.291342	10.708658	10.008152	9.991848	56	44
17	15	9.283352	10.716648	9.291510	10.708490	10.008158	9.991842	45	43
18	30	9.283513	10.716487	9.291678	10.708322	10.008164	9.991836	30	42
19	45	9.283675	10.716325	9.291845	10.708155	10.008171	9.991829	15	41
20	5	9.283836	10.716164	9.292013	10.707987	10.008177	9.991823	55	40
21	15	9.283997	10.716003	9.292180	10.707820	10.008183	9 991817	45	39
22	30	9.284158	10.715842	9.292347	10.707653	10.008189	9.991811	30	38
23	45	9.284319	10.715681	9.292514	10.707486	10.008195	9.991805	15	37
24	6	9.284480	10.715520	9.292682	10.707318	10.008201	9.991799	54	36
25	15	9.284641	10.715359	9.292849	10.707151	10.008208	9.991792	45	35
26	30	9.284802	10.715198	9.293016	10.706984	10.008214	9.991786	30	34
27	45	9.284963	10.715037	9.293183	10.706817	10.008220	9.991780	15	33
28	7	9.285124	10.714876	9.293350	10.706650	10.008226	9.991774	53	32
29	15	9.285284	10.714716	9.293517	10.706483	10.008233	9.991767	45	31
30	30	9.285445	10.714555	9.293684	10.706316	10.008239	9.991761	30	30
31	45	9.285606	10.714394	9.293850	10.706150	10.008245	9.991755	15	29
32	8	9.285766	10.714234	9.294017	10.705983	10.008251	9.991749	52	28
33	15	9.285927	10.714073	9.294184	10.705816	10.008257	9.991743	45	27
34	30	9.286087	10.713913	9.294350	10.705650	10.008264	9.991736	30	26
35	45	9.286247	10.713753	9.294517	10.705483	10.008270	9.991730	15	25
36	9	9.286408	10.713592	9.294684	10.705316	10.008276	9.991724	51	24
37	15	9.286568	10.713432	9.294850	10.705150	10.008282	9.991718	45	23
38	30	9.286728	10.713272	9.295016	10.704984	10.008288	9.991712	30	22
39	45	9.286888	10.713112	9.295183	10.704817	10.008295	9.991705	15	21
40	10	9.287048	10.712952	9.295349	10.704651	10.008301	9.991699	50	20
41	15	9.287208	10.712792	9.295515	10.704485	10.008307	9.991693	45	19
42	30	9.287368	10.712632	9.295681	10.704319	10.008313	9.991687	30	18
43	45	9.287528	10.712472	9.295847	10.704153	10.008320	9.991680	15	17
44	11	9.287687	10.712313	9.296013	10.703987	10.008326	9.991674	49	16
45	15	9.287847	10.712153	9.296179	10.703821	10.008332	9.991668	45	15
46	30	9.288007	10.711993	9.296345	10.703655	10.008338	9.991662	30	14
47	45	9.288166	10.711834	9.296511	10.703489	10.008345	9.991655	15	13
48	12	9.288326	10.711674	9.296677	10.703323	10.008351	9.991649	48	12
49	15	9.288485	10.711515	9.296843	10.703157	10.008357	9.991643	45	11
50	30	9.288645	10.711355	9.297008	10.702992	10.008363	9.991637	30	10
51	45	9.288804	10.711196	9.297174	10.702826	10.008370	9.991630	15	9
52	13	9.288964	10.711036	9.297339	10.702661	10.008376	9.991624	47	8
53	15	9.289123	10.710877	9.297505	10.702495	10.008382	9.991618	45	7
54	30	9.289282	10.710718	9.297670	10.702330	10.008388	9.991612	30	6
55	45	9.289441	10.710559	9.297836	10.702164	10.008395	9.991605	15	5
56	14	9.289600	10.710400	9.298001	10.701999	10.008401	9.991599	46	4
57	15	9.289759	10.710241	9.298166	10.701834	10.008407	9.991593	45	3
58	30	9.289918	10.710082	9.298332	10.701668	10.008414	9.991586	30	2
59	45	9.290077	10.709923	9.298497	10.701503	10.008420	9.991580	15	1
60	15	9.290236	10.709764	9.298662	10.701338	10.008426	9.991574	45	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$5^h\ 15^m$.		LOG. SINES, &c.				78 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	0h 45m.		LOG. SINES, &c.				11 deg.		
0	15	9.290236	10.709764	9.298662	10.701338	10.008426	9.991574	45	60
1	15	9.290394	10.709606	9.298827	10.701173	10.008432	9.991568	45	59
2	30	9.290553	10.709447	9.298992	10.701008	10.008439	9.991561	30	58
3	45	9.290712	10.709288	9.299157	10.700843	10.008445	9.991555	15	57
4	16	9.290870	10.709130	9.299322	10 700678	10.008451	9.991549	44	56
5	15	9.291029	10.708971	9.299486	10.700514	10.008458	9.991542	45	55
6	30	9.291187	10.708813	9.299651	10.700349	10.008464	9.991536	30	54
7	45	9.291346	10.708654	9 299816	10.700184	10.008470	9.991530	15	53
8	17	9.291504	10.708496	9.299980	10.700020	10.008476	9.991524	43	52
9	15	9.291662	10.708338	9.300145	10.699855	10.008483	9.991517	45	51
10	30	9.291820	10.708180	9 300309	10.699691	10.008489	9.991511	30	50
11	45	9.291979	10.708021	9.300474	10.699526	10.008495	9.991505	15	49
12	18	9.292137	10.707863	9.300638	10.699362	10.008502	9.991498	42	48
13	15	9.292295	10.707705	9.300803	10.699197	10.008508	9.991492	45	47
14	30	9.292453	10.707547	9.300967	10.699033	10.008514	9.991486	30	46
15	45	9.292611	10.707389	9.301131	10.698869	10.008521	9.991479	15	45
16	19	9.292768	10.707232	9.301295	10.698705	10.008527	9.991473	41	44
17	15	9.292926	10.707074	9.301459	10.698541	10 008533	9.991467	45	43
18	30	9.293084	10.706916	9.301623	10.698377	10.008540	9.991460	30	42
19	45	9.293242	10.706758	9.301787	10.698213	10.008546	9.991454	15	41
20	20	9.293399	10.706601	9.301951	10.698049	10.008552	9.991448	40	40
21	15	9.293557	10.706443	9.302115	10.697885	10.008559	9.991441	45	39
22	30	9.293714	10.706286	9.302279	10.697721	10.008565	9.991435	30	38
23	45	9.293872	10.706128	9.302443	10.697557	10.008571	9.991429	15	37
24	21	9.294029	10.705971	9.302607	10.697393	10.008578	9 991422	39	36
25	15	9.294186	10.705814	9.302770	10.697230	10.008584	9.991416	45	35
26	30	9.294344	10.705656	9.302934	10.697066	10.008590	9.991410	30	34
27	45	9.294501	10.705499	9.303097	10.696903	10.008597	9.991403	15	33
28	22	9.294658	10.705342	9.303261	10.696739	10.008603	9.991397	38	32
29	15	9.294815	10.705185	9.303424	10.696576	10.008609	9.991391	45	31
30	30	9.294972	10.705028	9.303588	10 696412	10.008616	9.991384	30	30
31	45	9.295129	10.704871	9.303751	10.696249	10.008622	9.991378	15	29
32	23	9.295286	10.704714	9.303914	10.696086	10.008628	9.991372	37	28
33	15	9.295443	10.704557	9.304077	10.695923	10.008635	9.991365	45	27
34	30	9.295600	10.704400	9.304241	10.695759	10.008641	9.991359	30	26
35	45	9.295756	10.704244	9.304404	10.695596	10.008647	9.991353	15	25
36	24	9.295913	10.704087	9.304567	10.695433	10.008654	9.991346	36	24
37	15	9.296070	10.703930	9.304730	10.695270	10.008660	9.991340	45	23
38	30	9.296226	10.703774	9.304893	10.695107	10.008667	9.991333	30	22
39	45	9.296383	10.703617	9.305055	10.694945	10.008673	9.991327	15	21
40	25	9.296539	10.703461	9.305218	10.694782	10.008679	9.991321	35	20
41	15	9.296695	10.703305	9.305381	10.694619	10.008686	9.991314	45	19
42	30	9.296852	10.703148	9.305544	10.694456	10.008692	9.991308	30	18
43	45	9.297008	10.702992	9.305706	10.694294	10.008698	9 991302	15	17
44	26	9.297164	10.702836	9.305869	10.694131	10.008705	9 991295	34	16
45	15	9.297320	10.702680	9.306031	10.693969	10.008711	9.991289	45	15
46	30	9.297476	10.702524	9.306194	10.693806	10.008718	9.991282	30	14
47	45	9.297632	10.702368	9.306356	10.693644	10.008724	9.991276	15	13
48	27	9.297788	10.702212	9.306519	10.693481	10.008730	9.991270	33	12
49	15	9.297944	10.702056	9.3 6681	10.693319	10.008737	9.991263	45	11
50	30	9.298100	10.701900	9.306843	10.693157	10.008743	9.991257	30	10
51	45	9.298256	10.701744	9.307005	10.692995	10.008750	9.991250	15	9
52	28	9.298412	10.701588	9.307167	10.692833	10.008756	9.991244	32	8
53	15	9.298567	10.701433	9.307330	10.692670	10.008762	9.991238	45	7
54	30	9.298723	10.701277	9.307492	10.692508	10.008769	9.991231	30	6
55	45	9.298878	10.701122	9.307654	10.692346	10.008775	9.991225	15	5
56	29	9.299034	10.700966	9.307815	10.692185	10.008782	9.991218	31	4
57	15	9.299189	10.700811	9.307977	10.692023	10.008788	9.991212	45	3
58	30	9.299345	10.700655	9.308139	10.691861	10.008794	9.991206	30	2
59	45	9.299500	10.700500	9.308301	10.691699	10.008801	9.991199	15	1
60	30	9.299655	10.700345	9.308463	10.691537	10.008807	9.991193	30	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	3h 14m.		LOG. SINES, &c.				78 deg		

0h 46m.			LOG. SINES, &c.				11 deg.		
sec.	"	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	′	sec.
0	30	9.299655	10.700345	9.308463	10.691537	10.008807	9.991193	30	60
1	15	9.299810	10.700190	9.308624	10.691376	10.008814	9.991186	45	59
2	30	9.299966	10.700034	9.308786	10.691214	10.008820	9.991180	30	58
3	45	9.300121	10.699879	9.308947	10.691053	10.008827	9.991173	15	57
4	31	9.300276	10.699724	9.309109	10.690891	10.008833	9.991167	29	56
5	15	9.300431	10.699569	9.309270	10.690730	10.008840	9.991160	45	55
6	30	9.300586	10.699414	9.309432	10.690568	10.008846	9.991154	30	54
7	45	9.300740	10.699260	9.309593	10.690407	10.008852	9.991148	15	53
8	32	9.300895	10.699105	9.309754	10.690246	10.008859	9.991141	28	52
9	15	9.301050	10.698950	9.309915	10.690085	10.008865	9.991135	45	51
10	30	9.301205	10.698795	9.310076	10.689924	10.008872	9.991128	30	50
11	45	9.301359	10.698641	9.310237	10.689763	10.008878	9.991122	15	49
12	33	9.301514	10.698486	9.310398	10.689602	10.008885	9.991115	27	48
13	15	9.301668	10.698332	9.310559	10.689441	10.008891	9.991109	45	47
14	30	9.301823	10.698177	9.310720	10.689280	10.008898	9.991102	30	46
15	45	9.301977	10.698023	9.310881	10.689119	10.008904	9.991096	15	45
16	34	9.302132	10.697868	9.311042	10.688958	10.008910	9.991090	26	44
17	15	9.302286	10.697714	9.311203	10.688797	10.008917	9.991083	45	43
18	30	9.302440	10.697560	9.311363	10.688637	10.008923	9.991077	30	42
19	45	9.302594	10.697406	9.311524	10.688476	10.008930	9.991070	15	41
20	35	9.302748	10.697252	9.311685	10.688315	10.008936	9.991064	25	40
21	15	9.302903	10.697097	9.311845	10.688155	10.008943	9.991057	45	39
22	30	9.303057	10.696943	9.312006	10.687994	10.008949	9.991051	30	38
23	45	9.303210	10.696790	9.312166	10.687834	10.008956	9.991044	15	37
24	36	9.303364	10.696636	9.312327	10.687673	10.008962	9.991038	24	36
25	15	9.303518	10.696482	9.312487	10.687513	10.008969	9.991031	45	35
26	30	9.303672	10.696328	9.312647	10.687353	10.008975	9.991025	30	34
27	45	9.303826	10.696174	9.312807	10.687193	10.008982	9.991018	15	33
28	37	9.303979	10.696021	9.312967	10.687033	10.008988	9.991012	23	32
29	15	9.304133	10.695867	9.313128	10.686872	10.008995	9.991005	45	31
30	30	9.304286	10.695714	9.313288	10.686712	10.009001	9.990999	30	30
31	45	9.304440	10.695560	9.313448	10.686552	10.009008	9.990992	15	29
32	38	9.304593	10.695407	9.313608	10.686392	10.009014	9.990986	22	28
33	15	9.304747	10.695253	9.313767	10.686233	10.009021	9.990979	45	27
34	30	9.304900	10.695100	9.313927	10.686073	10.009027	9.990973	30	26
35	45	9.305053	10.694947	9.314087	10.685913	10.009034	9.990966	15	25
36	39	9.305207	10.694793	9.314247	10.685753	10.009040	9.990960	21	24
37	15	9.305360	10.694640	9.314406	10.685594	10.009047	9.990953	45	23
38	30	9.305513	10.694487	9.314566	10.685434	10.009053	9.990947	30	22
39	45	9.305666	10.694334	9.314726	10.685274	10.009060	9.990940	15	21
40	40	9.305819	10.694181	9.314885	10.685115	10.009066	9.990934	20	20
41	15	9.305972	10.694028	9.315045	10.684955	10.009073	9.990927	45	19
42	30	9.306125	10.693875	9.315204	10.684796	10.009079	9.990921	30	18
43	45	9.306277	10.693723	9.315363	10.684637	10.009086	9.990914	15	17
44	41	9.306430	10.693570	9.315523	10.684477	10.009092	9.990908	19	16
45	15	9.306583	10.693417	9.315682	10.684318	10.009099	9.990901	45	15
46	30	9.306736	10.693264	9.315841	10.684159	10.009105	9.990895	30	14
47	45	9.306888	10.693112	9.316000	10.684000	10.009112	9.990888	15	13
48	42	9.307041	10.692959	9.316159	10.683841	10.009119	9.990881	18	12
49	15	9.307193	10.692807	9.316318	10.683682	10.009125	9.990875	45	11
50	30	9.307346	10.692654	9.316477	10.683523	10.009132	9.990868	30	10
51	45	9.307498	10.692502	9.316636	10.683364	10.009138	9.990862	15	9
52	43	9.307650	10.692350	9.316795	10.683205	10.009145	9.990855	17	8
53	15	9.307803	10.692197	9.316954	10.683046	10.009151	9.990849	45	7
54	30	9.307955	10.692045	9.317112	10.682888	10.009158	9.990842	30	6
55	45	9.308107	10.691893	9.317271	10.682729	10.009164	9.990836	15	5
56	44	9.308259	10.691741	9.317430	10.682570	10.009171	9.990829	16	4
57	15	9.308411	10.691589	9.317588	10.682412	10.009177	9.990823	45	3
58	30	9.308563	10.691437	9.317747	10.682253	10.009184	9.990816	30	2
59	45	9.308715	10.691285	9.317905	10.682095	10.009191	9.990809	15	1
60	45	9.308867	10.691133	9.318064	10.681936	10.009197	9.990803	15	0
sec.	′ "	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	" ′	sec.
5h 13m			LOG. SINES, &c.				78 deg.		

0h 47m.				LOG. SINES, &c.			11 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	45	9.308867	10.691133	9.318064	10.681936	10.009197	9.990803	15	60
1	15	9.309019	10 690981	9.318222	10.681778	10.009204	9.990796	45	59
2	30	9.309170	10.690830	9.318381	10.681619	10.009210	9.990790	30	58
3	45	9.309322	10.690678	9.318539	10.68.461	10.009217	9.990783	15	57
4	46	9.309474	10 690526	9.318697	10.681303	10.009223	9.990777	14	56
5	15	9.309625	10.690375	9.318855	10.681145	10.009230	9.990770	45	55
6	30	9.309777	10 690223	9.319013	10.680987	10.009237	9.990763	30	54
7	45	9.309928	10.690072	9.319171	10.680829	10.009243	9.990757	15	53
8	47	9.310080	10.689920	9.319329	10.680671	10.009250	9.990750	13	52
9	15	9.310231	10.689769	9.319487	10.680513	10.009256	9.990744	45	51
10	30	9.310382	10.689618	9.319645	10.680355	10.009263	9.990737	30	50
11	45	9.310534	10.689466	9.319803	10.680197	10.009270	9.990730	15	49
12	48	9.310685	10.689315	9.319961	10.680039	10.009276	9.990724	12	48
13	15	9.310836	10.689164	9.320119	10.679881	10.009283	9.990717	45	47
14	30	9.310987	10.689013	9.320276	10.679724	10.009289	9.990711	30	46
15	45	9.311138	10.688862	9.320434	10.679566	10.009296	9.990704	15	45
16	49	9.311289	10.688711	9.320592	10.679408	10.009303	9.990697	11	44
17	15	9.311440	10.688560	9.320749	10.679251	10.009309	9.990691	45	43
18	30	9.311591	10.688409	9.320907	10.679093	10.009316	9.990684	30	42
19	45	9.311742	10.688258	9.321064	10.678936	10.009322	9.990678	15	41
20	50	9.311893	10.688107	9.321222	10.678778	10.009329	9.990671	10	40
21	15	9.312043	10.687957	9.321379	10.678621	10.009336	9.990664	45	39
22	30	9.312194	10.687806	9.321536	10.678464	10.009342	9.990658	30	38
23	45	9.312345	10.687655	9.321693	10.678307	10.009349	9.990651	15	37
24	51	9.312495	10.687505	9.321851	10.678149	10.009356	9.990644	9	36
25	15	9.312646	10.687354	9.322008	10.677992	10.009362	9.990638	45	35
26	30	9.312796	10.687204	9.322165	10.677835	10.009369	9.990631	30	34
27	45	9.312946	10.687054	9.322322	10.677678	10.009375	9.990625	15	33
28	52	9.313097	10.686903	9.322479	10.677521	10.009382	9.990618	8	32
29	15	9.313247	10.686753	9.322636	10.677364	10.009389	9.990611	45	31
30	30	9.313397	10.686603	9.322793	10.677207	10.009395	9.990605	30	30
31	45	9.313547	10.686453	9.322949	10.677051	10.009402	9.990598	15	29
32	53	9.313698	10.686302	9.323106	10.676894	10.009409	9.990591	7	28
33	15	9.313848	10.686152	9.323263	10.676737	10.009415	9.990585	45	27
34	30	9.313998	10.686002	9.323419	10.676581	10.009422	9.990578	30	26
35	45	9.314148	10.685852	9.323576	10.676424	10.009429	9.990571	15	25
36	54	9.314297	10.685703	9.323733	10.676267	10.009435	9.990565	6	24
37	15	9.314447	10.685553	9.323889	10.676111	10.009442	9.990558	45	23
38	30	9.314597	10.685403	9.324046	10.675954	10.009449	9.990551	30	22
39	45	9.314747	10.685253	9.324202	10.675798	10.009455	9.990545	15	21
40	55	9.314896	10.685104	9.324358	10.675642	10.009462	9.990538	5	20
41	15	9.315046	10.684954	9.324515	10.675485	10.009469	9.990531	45	19
42	30	9.315196	10.684804	9.324671	10.675329	10.009475	9.990525	30	18
43	45	9.315345	10.684655	9.324827	10.675173	10.009482	9.990518	15	17
44	56	9.315495	10.684505	9.324983	10.675017	10.009489	9.990511	4	16
45	15	9.315644	10.684356	9.325139	10.674861	10.009495	9.990505	45	15
46	30	9.815793	10.684207	9.325295	10.674705	10.009502	9.990498	30	14
47	45	9.315943	10.684057	9.325451	10.674549	10.009509	9.990491	15	13
48	57	9.316092	10.683908	9.325607	10.674393	10.009515	9.990485	3	12
49	15	9.316241	10.683759	9.325763	10.674237	10.009522	9.990478	45	11
50	30	9.316390	10.683610	9.325919	10.674081	10.009529	9.990471	30	10
51	45	9.316539	10.683461	9.326075	10.673925	10.009535	9.990465	15	9
52	58	9.316688	10.683312	9.326230	10.673770	10.009542	9.990458	2	8
53	15	9.316837	10.683163	9.326386	10.673614	10.009549	9.990451	45	7
54	30	9.316986	10.683014	9.326542	10.673458	10.009555	9.990445	30	6
55	45	9.317135	10.682865	9.326697	10.673303	10.009562	9.990438	15	5
56	59	9.317284	10.682716	9.326853	10.673147	10.009569	9.990431	1	4
57	15	9.317433	10.682567	9.327008	10.672992	10.009576	9.990424	45	3
58	30	9.317582	10.682418	9.327164	10.672836	10.009582	9.990418	30	2
59	45	9.317730	10.682270	9.327319	10.672681	10.009589	9.990411	15	1
60	60	9.317879	10.682121	9.327474	10.672526	10.009596	9.990404	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
5h 12m.				LOG. SINES, &c.			78 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
		$0^h\ 48^m$.		LOG. SINES, &c.			12 deg.		
0	0	9.317879	10.682121	9.327474	10.672526	10.009596	9.990404	60	60
1	15	9.318027	10.681973	9.327630	10.672370	10.009602	9.990398	45	59
2	30	9.318176	10.681824	9.327785	10.672215	10.009609	9.990391	30	58
3	45	9.318324	10.681676	9.327940	10.672060	10.009616	9.990384	15	57
4	1	9.318473	10.681527	9.328095	10.671905	10.009623	9.990377	59	56
5	15	9.318621	10.681379	9.328250	10.671750	10.009629	9.990371	45	55
6	30	9.318769	10.681231	9.328405	10.671595	10.009636	9.990364	30	54
7	45	9.318918	10.681082	9.328560	10.671440	10.009643	9.990357	15	53
8	2	9.319066	10.680934	9.328715	10.671285	10.009649	9.990351	58	52
9	15	9.319214	10.680786	9.328870	10.671130	10.009656	9.990344	45	51
10	30	9.319362	10.680638	9.329025	10.670975	10.009663	9.990337	30	50
11	45	9.319510	10.680490	9.329180	10.670820	10.009670	9.990330	15	49
12	3	9.319658	10.680342	9.329334	10.670666	10.009676	9.990324	57	48
13	15	9.319806	10.680194	9.329489	10.670511	10.009683	9.990317	45	47
14	30	9.319954	10.680046	9.329644	10.670356	10.009690	9.990310	30	46
15	45	9.320102	10.679898	9.329798	10.670202	10.009697	9.990303	15	45
16	4	9.320249	10.679751	9.329953	10.670047	10.009703	9.990297	56	44
17	15	9.320397	10.679603	9.330107	10.669893	10.009710	9.990290	45	43
18	30	9.320545	10.679455	9.330262	10.669738	10.009717	9.990283	30	42
19	45	9.320692	10.679308	9.330416	10.669584	10.009724	9.990276	15	41
20	5	9.320840	10.679160	9.330570	10.669430	10.009730	9.990270	55	40
21	15	9.320987	10.679013	9.330725	10.669275	10.009737	9.990263	45	39
22	30	9.321135	10.678865	9.330879	10.669121	10.009744	9.990256	30	38
23	45	9.321282	10.678718	9.331033	10.668967	10.009751	9.990249	15	37
24	6	9.321430	10.678570	9.331187	10.668813	10.009757	9.990243	54	36
25	15	9.321577	10.678423	9.331341	10.668659	10.009764	9.990236	45	35
26	30	9.321724	10.678276	9.331495	10.668505	10.009771	9.990229	30	34
27	45	9.321871	10.678129	9.331649	10.668351	10.009778	9.990222	15	33
28	7	9.322019	10.677981	9.331803	10.668197	10.009785	9.990215	53	32
29	15	9.322166	10.677834	9.331957	10.668043	10.009791	9.990209	45	31
30	30	9.322313	10.677687	9.332111	10.667889	10.009798	9.990202	30	30
31	45	9.322460	10.677540	9.332265	10.667735	10.009805	9.990195	15	29
32	8	9.322607	10.677393	9.332418	10.667582	10.009812	9.990188	52	28
33	15	9.322753	10.677247	9.332572	10.667428	10.009818	9.990182	45	27
34	30	9.322900	10.677100	9.332726	10.667274	10.009825	9.990175	30	26
35	45	9.323047	10.676953	9.332879	10.667121	10.009832	9.990168	15	25
36	9	9.323194	10.676806	9.333033	10.666967	10.009839	9.990161	51	24
37	15	9.323340	10.676660	9.333186	10.666814	10.009846	9.990154	45	23
38	30	9.323487	10.676513	9.333340	10.666660	10.009852	9.990148	30	22
39	45	9.323634	10.676366	9.333493	10.666507	10.009859	9.990141	15	21
40	10	9.323780	10.676220	9.333646	10.666354	10.009866	9.990134	50	20
41	15	9.323927	10.676073	9.333799	10.666201	10.009873	9.990127	45	19
42	30	9.324073	10.675927	9.333953	10.666047	10.009880	9.990120	30	18
43	45	9.324219	10.675781	9.334106	10.665894	10.009887	9.990113	15	17
44	11	9.324366	10.675634	9.334259	10.665741	10.009893	9.990107	49	16
45	15	9.324512	10.675488	9.334412	10.665588	10.009900	9.990100	45	15
46	30	9.324658	10.675342	9.334565	10.665435	10.009907	9.990093	30	14
47	45	9.324804	10.675196	9.334718	10.665282	10.009914	9.990086	15	13
48	12	9.324950	10.675050	9.334871	10.665129	10.009921	9.990079	48	12
49	15	9.325096	10.674904	9.335024	10.664976	10.009927	9.990073	45	11
50	30	9.325242	10.674758	9.335177	10.664823	10.009934	9.990066	30	10
51	45	9.325388	10.674612	9.335330	10.664670	10.009941	9.990059	15	9
52	13	9.325534	10.674466	9.335482	10.664518	10.009948	9.990052	47	8
53	15	9.325680	10.674320	9.335635	10.664365	10.009955	9.990045	45	7
54	30	9.325826	10.674174	9.335788	10.664212	10.009962	9.990038	30	6
55	45	9.325972	10.674028	9.335940	10.664060	10.009969	9.990031	15	5
56	14	9.326117	10.673883	9.336093	10.663907	10.009975	9.990025	46	4
57	15	9.326263	10.673737	9.336245	10.663755	10.009982	9.990018	45	3
58	30	9.326409	10.673591	9.336398	10.663602	10.009989	9.990011	30	2
59	45	9.326554	10.673446	9.336550	10.663450	10.009996	9.990004	15	1
60	15	9.326700	10.673300	9.336702	10.663298	10.010003	9.989997	45	0
sec.	′ ″	cosine.	secant.	cotangent	tangent.	cosecant.	sine	″ ′	sec.
		$5^h\ 11^m$		LOG. SINES, &c.			77 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	$0^h\ 49^m$.		LOG. SINES, &c.				12 deg.		
0	15	9.326700	10.673300	9.336702	10.663298	10.010003	9.989997	45	60
1	15	9.326845	10.673155	9.336855	10.663145	10.010010	9.989990	45	59
2	30	9.326990	10.673010	9.337007	10.662993	10.010016	9.989984	30	58
3	45	9.327136	10.672864	9.337159	10.662841	10.010023	9.989977	15	57
4	16	9.327281	10.672719	9.337311	10.662689	10.010030	9 989970	44	56
5	15	9.327426	10.672574	9.337463	10.662537	10.010037	9.989963	45	55
6	30	9.327571	10.672429	9.337615	10.662385	10.010044	9.989956	30	54
7	45	9.327717	10.672283	9.337767	10.662233	10.010051	9.989949	15	53
8	17	9.327862	10.672138	9.337919	10.662081	10.010058	9.989942	43	52
9	15	9.328007	10.671993	9.338071	10.661929	10.010065	9.989935	45	51
10	30	9.328152	10.671848	9.338223	10.661777	10.010071	9.989929	30	50
11	45	9.328297	10.671703	9.338375	10.661626	10.010078	9.989922	15	49
12	18	9.328442	10.671558	9.338527	10.661473	10.010085	9.989915	42	48
13	15	9.328586	10.671414	9.338678	10.661322	10.010092	9.989908	45	47
14	30	9.328731	10.671269	9.338830	10.661170	10.010099	9.989901	30	46
15	45	9.328876	10.671124	9.338982	10.661018	10.010106	9.989894	15	45
16	19	9.329021	10.670979	9.339133	10.660867	10.010113	9.989887	41	44
17	15	9.329165	10.670835	9.339285	10.660715	10.010120	9.989880	45	43
18	30	9.329310	10.670690	9.339436	10.660564	10.010127	9.989873	30	42
19	45	9.329454	10.670546	9.339588	10.660412	10.010133	9.989867	15	41
20	20	9.329599	10.670401	9.339739	10.660261	10.010140	9.989860	40	40
21	15	9.329743	10.670257	9.339890	10.660110	10.010147	9.989853	45	39
22	30	9.329887	10.670113	9.340042	10.659958	10.010154	9.989846	30	38
23	45	9.330032	10.669968	9.340193	10.659807	10.010161	9.989839	15	37
24	21	9.330176	10.669824	9.340344	10.659656	10.010168	9.989832	39	36
25	15	9.330320	10.669680	9.340495	10.659505	10.010175	9.989825	45	35
26	30	9.330464	10.669536	9.340646	10.659354	10.010182	9.989818	30	34
27	45	9.330609	10.669391	9.340797	10.659203	10.010189	9.989811	15	33
28	22	9.330753	10.669247	9.340948	10.659052	10.010196	9.989804	38	32
29	15	9.330897	10.669103	9.341099	10.658901	10.010203	9.989797	45	31
30	30	9.331041	10.668959	9.341250	10.658750	10.010210	9.989790	30	30
31	45	9.331185	10.668815	9.341401	10.658599	10.010216	9.989784	15	29
32	23	9.331328	10.668672	9.341552	10.658448	10.010223	9.989777	37	28
33	15	9.331472	10.668528	9.341703	10.658297	10.010230	9.989770	45	27
34	30	9.331616	10.668384	9.341853	10.658147	10.010237	9.989763	30	26
35	45	9.331760	10.668240	9.342004	10.657996	10.010244	9.989756	15	25
36	24	9.331903	10.668097	9.342155	10.657845	10.010251	9.989749	36	24
37	15	9.332047	10.667953	9.342305	10.657695	10.010258	9.989742	45	23
38	30	9.332191	10.667809	9.342456	10.657544	10.010265	9.989735	30	22
39	45	9.332334	10.667666	9.342606	10.657394	10.010272	9.989728	15	21
40	25	9.332478	10.667522	9.342757	10.657243	10.010279	9.989721	35	20
41	15	9.332621	10.667379	9.342907	10.657093	10.010286	9.989714	45	19
42	30	9.332764	10.667236	9.343057	10.656943	10.010293	9.989707	30	18
43	45	9.332908	10.667092	9.343208	10.656792	10.010300	9.989700	15	17
44	26	9.333051	10.666949	9.343358	10.656642	10.010307	9.989693	34	16
45	15	9.333194	10.666806	9.343508	10.656492	10.010314	9.989686	45	15
46	30	9.333337	10.666663	9.343658	10.656342	10.010321	9.989679	30	14
47	45	9.333481	10.666519	9.343808	10.656192	10.010328	9.989672	15	13
48	27	9.333624	10.666376	9.343958	10.656042	10.010335	9.989665	33	12
49	15	9.333767	10.666233	9.344108	10.655892	10.010342	9.989658	45	11
50	30	9.333910	10.666090	9.344258	10.655742	10.010349	9.989651	30	10
51	45	9.334053	10.665947	9.344408	10.655592	10.010356	9.989644	15	9
52	28	9.334195	10.665805	9.344558	10.655442	10.010363	9.989637	32	8
53	15	9.334338	10.665662	9.344708	10.655292	10.010370	9.989630	45	7
54	30	9.334481	10.665519	9.344858	10.655142	10.010377	9.989623	30	6
55	45	9.334624	10.665376	9.345007	10.654993	10.010384	9.989616	15	5
56	29	9.334766	10.665234	9.345157	10.654843	10.010391	9.989609	31	4
57	15	9.334909	10.665091	9.345307	10.654693	10.010398	9.989602	45	3
58	30	9.335052	10.664948	9.345456	10.654544	10.010405	9.989595	30	2
59	45	9.335194	10.664806	9.345606	10.654394	10.010412	9.989588	15	1
60	30	9.335337	10.664663	9.345755	10.654245	10.010419	9.989581	30	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$5^h\ 10^m$.		LOG. SINES, &c.				77 deg.		

sec.	0h 50m. ′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	30	9.335337	10.664663	9.345755	10.654245	10.010419	9.989581	30	60
1	15	9.335479	10.664521	9.345905	10.654095	10.010426	9.989574	45	59
2	30	9.335622	10.664378	9.346054	10.653946	10.010433	9.989567	30	58
3	45	9.335764	10.664236	9.346203	10.653797	10.010440	9.989560	15	57
4	31	9.335906	10.664094	9.346353	10.653647	10.010447	9.989553	29	56
5	15	9.336048	10.663952	9.346502	10.653498	10.010454	9.989546	45	55
6	30	9.336191	10.663809	9.346651	10.653349	10.010461	9.989539	30	54
7	45	9.336333	10.663667	9.346800	10.653200	10.010468	9.989532	15	53
8	32	9.336475	10.663525	9.346949	10.653051	10.010475	9.989525	28	52
9	15	9.336617	10.663383	9.347098	10.652902	10.010482	9.989518	45	51
10	30	9.336759	10.663241	9.347247	10.652753	10.010489	9.989511	30	50
11	45	9.336901	10.663099	9.347396	10.652604	10.010496	9.989504	15	49
12	33	9.337043	10.662957	9.347545	10.652455	10.010503	9.989497	27	48
13	15	9.337185	10.662815	9.347694	10.652306	10.010510	9.989490	45	47
14	30	9.337326	10.662674	9.347843	10.652157	10.010517	9.989483	30	46
15	45	9.337468	10.662532	9.347992	10.652008	10.010524	9.989476	15	45
16	34	9.337610	10.662390	9.348141	10.651859	10.010531	9.989469	26	44
17	15	9.337751	10.662249	9.348289	10.651711	10.010538	9.989462	45	43
18	30	9.337893	10.662107	9.348438	10.651562	10.010545	9.989455	30	42
19	45	9.338035	10.661965	9.348587	10.651413	10.010552	9.989448	15	41
20	35	9.338176	10.661824	9.348735	10.651265	10.010559	9.989441	25	40
21	15	9.338318	10.661682	9.348884	10.651116	10.010566	9.989434	45	39
22	30	9.338459	10.661541	9.349032	10.650968	10.010573	9.989427	30	38
23	45	9.338600	10.661400	9.349181	10.650819	10.010580	9.989420	15	37
24	36	9.338742	10.661258	9.349329	10.650671	10.010587	9.989413	24	36
25	15	9.338883	10.661117	9.349477	10.650523	10.010594	9.989406	45	35
26	30	9.339024	10.660976	9.349626	10.650374	10.010601	9.989399	30	34
27	45	9.339165	10.660835	9.349774	10.650226	10.010608	9.989392	15	33
28	37	9.339306	10.660694	9.349922	10.650078	10.010616	9.989384	23	32
29	15	9.339448	10.660552	9.350070	10.649930	10.010623	9.989377	45	31
30	30	9.339589	10.660411	9.350218	10.649782	10.010630	9.989370	30	30
31	45	9.339730	10.660270	9.350366	10.649634	10.010637	9.989363	15	29
32	38	9.339871	10.660129	9.350514	10.649486	10.010644	9.989356	22	28
33	15	9.340011	10.659989	9.350662	10.649338	10.010651	9.989349	45	27
34	30	9.340152	10.659848	9.350810	10.649190	10.010658	9.989342	30	26
35	45	9.340293	10.659707	9.350958	10.649042	10.010665	9 989335	15	25
36	39	9.340434	10.659566	9.351106	10.648894	10.010672	9.989328	21	24
37	15	9.340574	10.659426	9.351254	10.648746	10.010679	9.989321	45	23
38	30	9.340715	10.659285	9.351401	10.648599	10.010686	9.989314	30	22
39	45	9.340856	10.659144	9.351549	10.648451	10.010693	9.989307	15	21
40	40	9.340996	10.659004	9.351697	10.648303	10.010701	9.989299	20	20
41	15	9.341137	10.658863	9.351844	10.648156	10.010708	9.989292	45	19
42	30	9.341277	10.658723	9.351992	10.648008	10.010715	9.989285	30	18
43	45	9.341418	10.658582	9.352139	10.647861	10.010722	9.989278	15	17
44	41	9.341558	10.658442	9.352287	10.647713	10.010729	9.989271	19	16
45	15	9.341698	10.658302	9.352434	10.647566	10.010736	9.989264	45	15
46	30	9.341839	10.658161	9.352582	10.647418	10.010743	9.989257	30	14
47	45	9.341979	10.658021	9.352729	10.647271	10.010750	9.989250	15	13
48	42	9.342119	10.657881	9.352876	10.647124	10.010757	9.989243	18	12
49	15	9.342259	10.657741	9.353024	10.646976	10.010765	9.989235	45	11
50	30	9.342399	10.657601	9.353171	10.646829	10.010772	9.989228	30	10
51	45	9.342539	10.657461	9.353318	10.646682	10.010779	9.989221	15	9
52	43	9.342679	10.657321	9.353465	10.646535	10.010786	9.989214	17	8
53	15	9.342819	10.657181	9.353612	10.646388	10.010793	9.989207	45	7
54	30	9.342959	10.657041	9.353759	10.646241	10.010800	9.989200	30	6
55	45	9.343099	10.656901	9.353906	10.646094	10.010807	9.989193	15	5
56	44	9.343239	10.656761	9.354053	10.645947	10.010814	9.989186	16	4
57	15	9.343378	10.656622	9.354200	10.645800	10.010822	9.989178	45	3
58	30	9.343518	10.656482	9.354347	10.645653	10.010829	9.989171	30	2
59	45	9.343658	10.656342	9.354493	10.645507	10.010836	9.989164	15	1
60	45	9.343797	10.656203	9.354640	10.645360	10.010843	9.989157	15	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	$0^h\ 51^m$.		LOG. SINES, &c.				12 deg.		
0	45	9.343797	10.656203	9.354640	10.645360	10.010843	9.989157	15	60
1	15	9.343937	10.656063	9.354787	10.645213	10.010850	9.989150	45	59
2	30	9.344076	10.655924	9.354934	10.645066	10.010857	9.989143	30	58
3	45	9.344216	10.655784	9.355080	10 644920	10.010864	9.989136	15	57
4	46	9.344355	10.655645	9.355227	10.644773	10.010872	9.989128	14	56
5	15	9.344495	10.655505	9.355373	10.644627	10.010879	9.989121	45	55
6	30	9.344634	10.655366	9.355520	10.644480	10.010886	9.989114	30	54
7	45	9.344773	10.655227	9.355666	10.644334	10.010893	9.989107	15	53
8	47	9.344912	10.655088	9.355813	10.644187	10.010900	9.989100	13	52
9	15	9.345052	10.654948	9.355959	10.644041	10.010907	9.989093	45	51
10	30	9.345191	10.654809	9.356105	10.643895	10.010915	9.989085	30	50
11	45	9.345330	10.654670	9.356251	10.643749	10.010922	9.989078	15	49
12	48	9.345469	10.654531	9.356398	10.643602	10.010929	9.989071	12	48
13	15	9.345608	10.654392	9.356544	10.643456	10.010936	9.989064	45	47
14	30	9.345747	10.654253	9.356690	10.643310	10.010943	9.989057	30	46
15	45	9.345886	10.654114	9.356836	10.643164	10.010950	9.989050	15	45
16	49	9.346024	10.653976	9.356982	10.643018	10.010958	9.989042	11	44
17	15	9.346163	10.653837	9.357128	10.642872	10 010965	9.989035	45	43
18	30	9.346302	10.653698	9.357274	10.642726	10.010972	9.989028	30	42
19	45	9.346441	10.653559	9.357420	10.642580	10.010979	9.989021	15	41
20	50	9.346579	10.653421	9.357566	10.642434	10.010986	9.989014	10	40
21	15	9.346718	10.653282	9.357712	10.642288	10.010994	9.989006	45	39
22	30	9.346857	10.653143	9.357857	10.642143	10.011001	9.988999	30	38
23	45	9.346995	10.653005	9.358003	10.641997	10.011008	9.988992	15	37
24	51	9.347134	10.652866	9.358149	10.641851	10.011015	9.988985	9	36
25	15	9.347272	10.652728	9.358294	10.641706	10.011022	9.988978	45	35
26	30	9.347410	10.652590	9.358440	10.641560	10.011030	9.988970	30	34
27	45	9.347549	10.652451	9.358585	10.641415	10.011037	9.988963	15	33
28	52	9.347687	10.652313	9.358731	10.641269	10.011044	9.988956	8	32
29	15	9.347825	10.652175	9.358876	10.641124	10.011051	9.988949	45	31
30	30	9.347963	10.652037	9.359022	10.640978	10.011058	9.988942	30	30
31	45	9.348102	10.651898	9.359167	10.640833	10.011066	9.988934	15	29
32	53	9.348240	10.651760	9.359313	10.640687	10.011073	9.988927	7	28
33	15	9.348378	10.651622	9.359458	10.640542	10.011080	9.988920	45	27
34	30	9.348516	10.651484	9.359603	10.640397	10.011087	9.988913	30	26
35	45	9.348654	10.651346	9.359748	10.640252	10.011095	9.988905	15	25
36	54	9.348792	10.651208	9.359893	10.640107	10.011102	9.988898	6	24
37	15	9.348930	10.651070	9.360039	10.639961	10.011109	9.988891	45	23
38	30	9.349067	10.650933	9.360184	10.639816	10.011116	9.988884	30	22
39	45	9.349205	10.650795	9.360329	10.639671	10.011124	9.988876	15	21
40	55	9.349343	10.650657	9.360474	10.639526	10.011131	9.988869	5	20
41	15	9.349481	10.650519	9.360619	10.639381	10.011138	9.988862	45	19
42	30	9.349618	10.650382	9.360763	10.639237	10.011145	9 988855	30	18
43	45	9.349756	10.650244	9.360908	10.639092	10.011153	9.988847	15	17
44	56	9.349893	10.650107	9.361053	10.638947	10.011160	9.988840	4	16
45	15	9.350031	10.649969	9.361198	10.638802	10.011167	9.988833	45	15
46	30	9.350168	10.649832	9.361343	10.638657	10.011174	9.988826	30	14
47	45	9.350306	10.649694	9.361487	10.638513	10.011182	9.988818	15	13
48	57	9.350443	10.649557	9.361632	10.638368	10.011189	9.988811	3	12
49	15	9.350580	10.649420	9.361776	10.638224	10.011196	9.988804	45	11
50	30	9.350718	10.649282	9.361921	10.638079	10.011203	9.988797	30	10
51	45	9.350855	10.649145	9.362065	10.637935	10.011211	9.988789	15	9
52	58	9.350992	10.649008	9.362210	10.637790	10.011218	9.988782	2	8
53	15	9.351129	10.648871	9.362354	10.637646	10.011225	9.988775	45	7
54	30	9.351266	10.648734	9.362499	10.637501	10.011232	9.988768	30	6
55	45	9.351403	10.648597	9.362643	10.637357	10.011240	9.988760	15	5
56	59	9.351540	10.648460	9.362787	10.637213	10.011247	9.988753	1	4
57	15	9.351677	10.648323	9.362932	10.637068	10.011254	9.988746	45	3
58	30	9.351814	10.648186	9.363076	10.636924	10.011262	9.988738	30	2
59	45	9.351951	10.648049	9.363220	10.636780	10.011269	9.988731	15	1
60	60	9.352088	10.647912	9.363364	10.636636	10.011276	9.988724	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$5^h\ 8^m$.		LOG. SINES, &c.				77 deg.		

0h 52m.		LOG. SINES, &c.					13 deg.		
′	″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″	′	sec.
0	0	9.352088	10.647912	9.363364	10.636636	10.011276	9.988724		60	60
1	15	9.352225	10.647775	9.363508	10.636492	10.011283	9.988717	45		59
2	30	9.352361	10.647639	9.363652	10.636348	10.011291	9.988709	30		58
3	45	9.352498	10.647502	9.363796	10.636204	10.011298	9.988702	15		57
4	1	9.352635	10.647365	9.363940	10.636060	10.011305	9.988695		59	56
6	15	9.352771	10.647229	9.364084	10.635916	10.011313	9.988687	45		55
6	30	9.352908	10.647092	9.364228	10.635772	10.011320	9.988680	30		54
7	45	9.353044	10.646956	9.364372	10.635628	10.011327	9.988673	15		53
8	2	9.353181	10.646819	9.364515	10.635485	10.011335	9.988665		58	52
9	15	9.353317	10.646683	9.364659	10.635341	10.011342	9.988658	45		51
10	30	9.353454	10.646546	9.364803	10.635197	10.011349	9.988651	30		50
11	45	9.353590	10.646410	9.364946	10.635054	10.011356	9.988644	15		49
12	3	9.353726	10.646274	9.365090	10.634910	10.011364	9.988636		57	48
13	15	9.353863	10.646137	9.365234	10.634766	10.011371	9.988629	45		47
14	30	9.353999	10.646001	9.365377	10.634623	10.011378	9.988622	30		46
15	45	9.354135	10.645865	9.365521	10.634479	10.011386	9.988614	15		45
16	4	9.354271	10.645729	9.365664	10.634336	10.011393	9.988607		56	44
17	15	9.354407	10.645593	9.365807	10.634193	10.011400	9.988600	45		43
18	30	9.354543	10.645457	9.365951	10.634049	10.011408	9.988592	30		42
19	45	9.354679	10.645321	9.366094	10.633906	10.011415	9.988585	15		41
20	5	9.354815	10.645185	9.366237	10.633763	10.011422	9.988578		55	40
21	15	9.354951	10.645049	9.366381	10.633619	10.011430	9.988570	45		39
22	30	9.355087	10.644913	9.366524	10.633476	10.011437	9.988563	30		38
23	45	9.355222	10.644778	9.366667	10.633333	10.011444	9.988556	15		37
24	6	9.355358	10.644642	9.366810	10.633190	10.011452	9.988548		54	36
25	15	9.355494	10.644506	9.366953	10.633047	10.011459	9.988541	45		35
26	30	9.355630	10.644370	9.367096	10.632904	10.011467	9.988533	30		34
27	45	9.355765	10.644235	9.367239	10.632761	10.011474	9.988526	15		33
28	7	9.355901	10.644099	9.367382	10.632618	10.011481	9.988519		53	32
29	15	9.356036	10.643964	9.367525	10.632475	10.011489	9.988511	45		31
30	30	9.356172	10.643828	9.367668	10.632332	10.011496	9.988504	30		30
31	45	9.356307	10.643693	9.367810	10.632190	10.011503	9.988497	15		29
32	8	9.356443	10.643557	9.367953	10.632047	10.011511	9.988489		52	28
33	15	9.356578	10.643422	9.368096	10.631904	10.011518	9.988482	45		27
34	30	9.356713	10.643287	9.368239	10.631761	10.011525	9.988475	30		26
35	45	9.356848	10.643152	9.368381	10.631619	10.011533	9.988467	15		25
36	9	9.356984	10.643016	9.368524	10.631476	10.011540	9.988460		51	24
37	15	9.357119	10.642881	9.368666	10.631334	10.011548	9.988452	45		23
38	30	9.357254	10.642746	9.368809	10.631191	10.011555	9.988445	30		22
39	45	9.357389	10.642611	9.368951	10.631049	10.011562	9.988438	15		21
40	10	9.357524	10.642476	9.369094	10.630906	10.011570	9.988430		50	20
41	15	9.357659	10.642341	9.369236	10.630764	10.011577	9.988423	45		19
42	30	9.357794	10.642206	9.369378	10.630622	10.011584	9.988416	30		18
43	45	9.357929	10.642071	9.369521	10.630479	10.011592	9.988408	15		17
44	11	9.358064	10.641936	9.369663	10.630337	10.011599	9.988401		49	16
45	15	9.358198	10.641802	9.369805	10.630195	10.011607	9.988393	45		15
46	30	9.358333	10.641667	9.369947	10.630053	10.011614	9.988386	30		14
47	45	9.358468	10.641532	9.370089	10.629911	10.011621	9.988379	15		13
48	12	9.358603	10.641397	9.370231	10.629769	10.011629	9.988371		48	12
49	15	9.358737	10.641263	9.370374	10.629626	10.011636	9.988364	45		11
50	30	9.358872	10.641128	9.370516	10.629484	10.011644	9.988356	30		10
51	45	9.359006	10.640994	9.370657	10.629343	10.011651	9.988349	15		9
52	13	9.359141	10.640859	9.370799	10.629201	10.011659	9.988341		47	8
53	15	9.359275	10.640725	9.370941	10.629059	10.011666	9.988334	45		7
54	30	9.359410	10.640590	9.371083	10.628917	10.011673	9.988327	30		6
55	45	9.359544	10.640456	9.371225	10.628775	10.011681	9.988319	15		5
56	14	9.359678	10.640322	9.371367	10.628633	10.011688	9.988312		46	4
57	15	9.359813	10.640187	9.371508	10.628492	10.011696	9.988304	45		3
58	30	9.359947	10.640053	9.371650	10.628350	10.011703	9.988297	30		2
59	45	9.360081	10.639919	9.371792	10.628208	10.011711	9.988289	15		1
60	15	9.360215	10.639785	9.371933	10.628067	10.011718	9.988282		45	0
sec.	′	″ cosine.	secant.	cotangent	tangent.	cosecant.	sine.	″	′	sec.
5h 7m.			LOG. SINES, &c.				76 deg.			

0h 53m.				LOG. SINES, &c.			13 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	′
0	15	9.360215	10.639785	9.371933	10.628067	10.011718	9.988282	45	60
1	15	9.360349	10.639651	9.372075	10.627925	10.011725	9.988275	45	59
2	30	9.360483	10.639517	9.372216	10.627784	10.011733	9.988267	30	58
3	45	9.360617	10.639383	9.372358	10.627642	10.011740	9.988260	15	57
4	16	9.360751	10.639249	9.372499	10.627501	10.011748	9.988252	44	56
5	15	9.360885	10.639115	9.372641	10.627359	10.011755	9.988245	45	55
6	30	9.361019	10.638981	9.372782	10.627218	10.011763	9.988237	30	54
7	45	9.361153	10.638847	9.372923	10.627077	10.011770	9.988230	15	53
8	17	9.361287	10.638713	9.373064	10.626936	10.011778	9.988222	43	52
9	15	9.361421	10.638579	9.373206	10.626794	10.011785	9.988215	45	51
10	30	9.361554	10.638446	9.373347	10.626653	10.011792	9.988208	30	50
11	45	9.361688	10.638312	9.373488	10.626512	10.011800	9.988200	15	49
12	18	9.361822	10.638178	9.373629	10.626371	10.011807	9.988193	42	48
13	15	9.361955	10.638045	9.373770	10.626230	10.011815	9.988185	45	47
14	30	9.362089	10.637911	9.373911	10.626089	10.011822	9.988178	30	46
15	45	9.362222	10.637778	9.374052	10.625948	10.011830	9.988170	15	45
16	19	9.362356	10.637644	9.374193	10.625807	10.011837	9.988163	41	44
17	15	9.362489	10.637511	9.374334	10.625666	10.011845	9.988155	45	43
18	30	9.362623	10.637377	9.374475	10.625525	10 011852	9.988148	30	42
19	45	9.362756	10.637244	9.374616	10.625384	10.011860	9.988140	15	41
20	20	9.362889	10.637111	9.374756	10.625244	10.011867	9.988133	40	40
21	15	9.363022	10.636978	9.374897	10.625103	10.011875	9.988125	45	39
22	30	9.363156	10.636844	9.375038	10.624962	10.011882	9.988118	30	38
23	45	9.363289	10.636711	9.375178	10.624822	10.011890	9.988110	15	37
24	21	9.363422	10.636578	9.375319	10.624681	10.011897	9.988103	39	36
25	15	9.363555	10.636445	9.375459	10.624541	10.011905	9.988095	45	35
26	30	9.363688	10.636312	9.375600	10.624400	10.011912	9.988088	30	34
27	45	9.363821	10.636179	9.375740	10.624260	10.011920	9.988080	15	33
28	22	9.363954	10.636046	9.375881	10.624119	10.011927	9.988073	38	32
29	15	9.364087	10.635913	9.376021	10.623979	10.011935	9.988065	45	31
30	30	9.364220	10.635780	9.376162	10.623838	10.011942	9.988058	30	30
31	45	9.364352	10.635648	9.376302	10.623698	10.011950	9.988050	15	29
32	23	9.364485	10.635515	9.376442	10.623558	10.011957	9.988043	37	28
33	15	9.364618	10.635382	9.376583	10.623417	10.011965	9.988035	45	27
34	30	9.364751	10.635249	9.376723	10.623277	10.011972	9.988028	30	26
35	45	9.364883	10.635117	9.376863	10.623137	10.011980	9.988020	15	25
36	24	9.365016	10.634984	9.377003	10.622997	10.011987	9.988013	36	24
37	15	9.365148	10.634852	9.377143	10.622857	10.011995	9.988005	45	23
38	30	9.365281	10.634719	9.377283	10.622717	10.012002	9.987998	30	22
39	45	9.365413	10.634587	9.377423	10.622577	10.012010	9.987990	15	21
40	25	9.365546	10.634454	9.377563	10.622437	10.012017	9.987983	35	20
41	15	9.365678	10.634322	9.377703	10.622297	10.012025	9.987975	45	19
42	30	9.365810	10.634190	9.377843	10.622157	10.012032	9.987968	30	18
43	45	9.365943	10.634057	9.377983	10.622017	10.012040	9.987960	15	17
44	26	9.366075	10.633925	9.378122	10.621878	10.012048	9.987952	34	16
45	15	9.366207	10.633793	9.378262	10.621738	10.012055	9.987945	45	15
46	30	9.366339	10.633661	9.378402	10.621598	10.012063	9.987937	30	14
47	45	9.366471	10.633529	9.378542	10.621458	10.012070	9.987930	15	13
48	27	9.366604	10.633396	9.378681	10.621319	10.012078	9.987922	33	12
49	15	9.366736	10.633264	9.378821	10.621179	10.012085	9.987915	45	11
50	30	9.366868	10.633132	9.378960	10.621040	10.012093	9.987907	30	10
51	45	9.367000	10.633000	9.379100	10.620900	10.012100	9.987900	15	9
52	28	9.367131	10.632869	9.379239	10.620761	10.012108	9.987892	32	8
53	15	9.367263	10.632737	9.379379	10.620621	10.012116	9.987884	45	7
54	30	9.367395	10.632605	9.379518	10.620482	10.012123	9.987877	30	6
55	45	9.367527	10.632473	9.379658	10.620342	10.012131	9.987869	15	5
56	29	9.367659	10.632341	9.379797	10.620203	10.012138	9.987862	31	4
57	15	9.367790	10.632210	9.379936	10.620064	10.012146	9.987854	45	3
58	30	9.367922	10.632078	9.380075	10.619925	10.012153	9.987847	30	2
59	45	9.368054	10.631946	9.380215	10.619785	10.012161	9.987839	15	1
60	30	9.368185	10.631815	9.380354	10.619646	10.012169	9.987831	30	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
5h 6m.				LOG. SINES, &c.			76 deg.		

$0^h\ 54^m$.			LOG. SINES, &c.			13 deg.			
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	30	9.368185	10.631815	9.380364	10.619646	10.012169	9.987831	30	60
1	15	9.368317	10.631683	9.380493	10.619507	10.012176	9.987824	45	59
2	30	9.368448	10.631552	9.380632	10.619368	10.012184	9.987816	30	58
3	45	9.368580	10.631420	9.380771	10.619229	10.012191	9.987809	15	57
4	31	9.368711	10.631289	9.380910	10.619090	10.012199	9.987801	29	56
5	15	9.368842	10.631158	9.381049	10.618951	10.012206	9.987794	45	55
6	30	9.368974	10.631026	9.381188	10.618812	10.012214	9.987786	30	54
7	45	9.369105	10.630895	9.381327	10.618673	10.012222	9.987778	15	53
8	32	9.369236	10.630764	9.381465	10.618535	10.012229	9.987771	28	52
9	15	9.369367	10.630633	9.381604	10.618396	10.012237	9.987763	45	51
10	30	9.369499	10.630501	9.381743	10.618257	10.012244	9.987756	30	50
11	45	9.369630	10.630370	9.381882	10.618118	10.012252	9.987748	15	49
12	33	9.369761	10.630239	9.382020	10.617980	10.012260	9.987740	27	48
13	15	9.369892	10.630108	9.382159	10.617841	10.012267	9.987733	45	47
14	30	9.370023	10.629977	9.382298	10.617702	10.012275	9.987725	30	46
15	45	9.370154	10.629846	9.382436	10.617564	10.012283	9.987717	15	45
16	34	9.370285	10.629715	9.382575	10.617425	10.012290	9.987710	26	44
17	15	9.370416	10.629584	9.382713	10.617287	10.012298	9.987702	45	43
18	30	9.370546	10.629454	9.382852	10.617148	10.012305	9.987695	30	42
19	45	9.370677	10.629323	9.382990	10.617010	10.012313	9.987687	15	41
20	35	9.370808	10.629192	9.383128	10.616872	10.012321	9.987679	25	40
21	15	9.370939	10.629061	9.383267	10.616733	10.012328	9.987672	45	39
22	30	9.371069	10.628931	9.383405	10.616595	10.012336	9.987664	30	38
23	45	9.371200	10.628800	9.383543	10.616457	10.012344	9.987656	15	37
24	36	9.371330	10.628670	9.383682	10.616318	10.012351	9.987649	24	36
25	15	9.371461	10.628539	9.383820	10.616180	10.012359	9.987641	45	35
26	30	9.371591	10.628409	9.383958	10.616042	10.012366	9.987634	30	34
27	45	9.371722	10.628278	9.384096	10.615904	10.012374	9.987626	15	33
28	37	9.371852	10.628148	9.384234	10.615766	10.012382	9.987618	23	32
29	15	9.371983	10.628017	9.384372	10.615628	10.012389	9.987611	45	31
30	30	9.372113	10.627887	9.384510	10.615490	10.012397	9.987603	30	30
31	45	9.372243	10.627757	9.384648	10.615352	10.012405	9.987595	15	29
32	38	9.372373	10.627627	9.384786	10.615214	10.012412	9.987588	22	28
33	15	9.372504	10.627496	9.384924	10.615076	10.012420	9.987580	45	27
34	30	9.372634	10.627366	9.385061	10.614939	10.012428	9.987572	30	26
35	45	9.372764	10.627236	9.385199	10.614801	10.012435	9.987565	15	25
36	39	9.372894	10.627106	9.385337	10.614663	10.012443	9.987557	21	24
37	15	9.373024	10.626976	9.385475	10.614525	10.012451	9.987549	45	23
38	30	9.373154	10.626846	9.385612	10.614388	10.012458	9.987542	30	22
39	45	9.373284	10.626716	9.385750	10.614250	10.012466	9.987534	15	21
40	40	9.373414	10.626586	9.385888	10.614112	10.012474	9.987526	20	20
41	15	9.373544	10.626456	9.386025	10.613975	10.012481	9.987519	45	19
42	30	9.373674	10.626326	9.386163	10.613837	10.012489	9.987511	30	18
43	45	9.373803	10.626197	9.386300	10.613700	10.012497	9.987503	15	17
44	41	9.373933	10.626067	9.386438	10.613562	10.012505	9.987495	19	16
45	15	9.374063	10.625937	9.386575	10.613425	10.012512	9.987488	45	15
46	30	9.374192	10.625808	9.386712	10.613288	10.012520	9.987480	30	14
47	45	9.374322	10.625678	9.386850	10.613150	10.012528	9.987472	15	13
48	42	9.374452	10.625548	9.386987	10.613013	10.012535	9.987465	18	12
49	15	9.374581	10.625419	9.387124	10.612876	10.012543	9.987457	45	11
50	30	9.374711	10.625289	9.387261	10.612739	10.012551	9.987449	30	10
51	45	9.374840	10.625160	9.387398	10.612602	10.012558	9.987442	15	9
52	43	9.374970	10.625030	9.387536	10.612464	10.012566	9.987434	17	8
53	15	9.375099	10.624901	9.387673	10.612327	10.012574	9.987426	45	7
54	30	9.375228	10.624772	9.387810	10.612190	10.012582	9.987418	30	6
55	45	9.375358	10.624642	9.387947	10.612053	10.012589	9.987411	15	5
56	44	9.375487	10.624513	9.388084	10.611916	10.012597	9.987403	16	4
57	15	9.375616	10.624384	9.388221	10.611779	10.012605	9.987395	45	3
58	30	9.375745	10.624255	9.388357	10.611643	10.012612	9.987388	30	2
59	45	9.375874	10.624126	9.388494	10.611506	10.012620	9.987380	15	1
60	45	9.376003	10.623997	9.388631	10.611369	10.012628	9.987372	15	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
$5^h\ 5^m$.			LOG. SINES, &c.			76 deg.			

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	$0^h\ 55^m$.		LOG. SINES, &c.				13 deg.		
0	45	9.376003	10.623997	9.388631	10.611369	10.012628	9.987372	15	60
1	5	9.376132	10.623868	9.388768	10.611232	10.012636	9.987364	45	59
2	30	9.376261	10.623739	9.388905	10.611095	10.012643	9.987357	30	58
3	45	9.376390	10.623610	9.389041	10.610959	10.012651	9.987349	15	57
4	46	9.376519	10.623481	9.389178	10.610822	10.012659	9.987341	14	56
5	15	9.376648	10.623352	9.389315	10.610685	10.012667	9.987333	45	55
6	30	9.376777	10.623223	9.389451	10.610549	10.012674	9.987326	30	54
7	45	9.376906	10.623094	9.389588	10.610412	10.012682	9.987318	15	53
8	47	9.377035	10.622965	9.389724	10.610276	10.012690	9.987310	13	52
9	15	9.377163	10.622837	9.389861	10.610139	10.012698	9.987302	45	51
10	30	9.377292	10.622708	9.389997	10.610003	10.012705	9.987295	30	50
11	45	9.377421	10.622579	9.390134	10.609866	10.012713	9.987287	15	49
12	48	9.377549	10.622451	9.390270	10.609730	10.012721	9.987279	12	48
13	15	9.377678	10.622322	9.390406	10.609594	10.012729	9.987271	45	47
14	30	9.377806	10.622194	9.390543	10.609457	10.012736	9.987264	30	46
15	45	9.377935	10.622065	9.390679	10.609321	10.012744	9.987256	15	45
16	49	9.378063	10.621937	9.390815	10.609185	10.012752	9.987248	11	44
17	15	9.378192	10.621808	9.390951	10.609049	10.012760	9.987240	45	43
18	30	9.378320	10.621680	9.391087	10.608913	10.012767	9.987233	30	42
19	45	9.378448	10.621552	9.391223	10.608777	10.012775	9.987225	15	41
20	50	9.378577	10.621423	9.391359	10.608641	10.012783	9.987217	10	40
21	15	9.378705	10.621295	9.391495	10.608505	10.012791	9.987209	45	39
22	30	9.378833	10.621167	9.391631	10.608369	10.012798	9.987202	30	38
23	45	9.378961	10.621039	9.391767	10.608233	10.012806	9.987194	15	37
24	51	9.379089	10.620911	9.391903	10.608097	10.012814	9.987186	9	36
25	15	9.379217	10.620783	9.392039	10.607961	10.012822	9.987178	45	35
26	30	9.379345	10.620655	9.392175	10.607825	10.012830	9.987170	30	34
27	45	9.379473	10.620527	9.392311	10.607689	10.012837	9.987163	15	33
28	52	9.379601	10.620399	9.392447	10.607553	10.012845	9.987155	8	32
29	15	9.379729	10.620271	9.392582	10.607418	10.012853	9.987147	45	31
30	30	9.379857	10.620143	9.392718	10.607282	10.012861	9.987139	30	30
31	45	9.379985	10.620015	9.392854	10.607146	10.012869	9.987131	15	29
32	53	9.380113	10.619887	9.392989	10.607011	10.012876	9.987124	7	28
33	15	9.380241	10.619759	9.393125	10.606875	10.012884	9.987116	45	27
34	30	9.380368	10.619632	9.393260	10.606740	10.012892	9.987108	30	26
35	45	9.380496	10.619504	9.393396	10.606604	10.012900	9.987100	15	25
36	54	9.380624	10.619376	9.393531	10.606469	10.012908	9.987092	6	24
37	15	9.380751	10.619249	9.393667	10.606333	10.012915	9.987085	45	23
38	30	9.380879	10.619121	9.393802	10.606198	10.012923	9.987077	30	22
39	45	9.381006	10.618994	9.393937	10.606063	10.012931	9.987069	15	21
40	55	9.381134	10.618866	9.394073	10.605927	10.012939	9.987061	5	20
41	15	9.381261	10.618739	9.394208	10.605792	10.012947	9.987053	45	19
42	30	9.381389	10.618611	9.394343	10.605657	10.012955	9.987045	30	18
43	45	9.381516	10.618484	9.394478	10.605522	10.012962	9.987038	15	17
44	56	9.381643	10.618357	9.394614	10.605386	10.012970	9.987030	4	16
45	15	9.381771	10.618229	9.394749	10.605251	10.012978	9.987022	45	15
46	30	9.381898	10.618102	9.394884	10.605116	10.012986	9.987014	30	14
47	45	9.382025	10.617975	9.395019	10.604981	10.012994	9.987006	15	13
48	57	9.382152	10.617848	9.395154	10.604846	10.013002	9.986998	3	12
49	15	9.382279	10.617721	9.395289	10.604711	10.013009	9.986991	45	11
50	30	9.382406	10.617594	9.395424	10.604576	10.013017	9.986983	30	10
51	45	9.382533	10.617467	9.395559	10.604441	10.013025	9.986975	15	9
52	58	9.382660	10.617340	9.395693	10.604307	10.013033	9.986967	2	8
53	15	9.382787	10.617213	9.395828	10.604172	10.013041	9.986959	45	7
54	30	9.382914	10.617086	9.395963	10.604037	10.013049	9.986951	30	6
55	45	9.383041	10.616959	9.396098	10.603902	10.013057	9.986943	15	5
56	59	9.383168	10.616832	9.396233	10.603767	10.013064	9.986936	1	4
57	15	9.383295	10.616705	9.396367	10.603633	10.013072	9.986928	45	3
58	30	9.383422	10.616578	9.396502	10.603498	10.013080	9.986920	30	2
59	45	9.383548	10.616452	9.396636	10.603364	10.013088	9.986912	15	1
60	60	9.383675	10.616325	9.396771	10.603229	10.013096	9.986904	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″	sec.
	$5^h\ 4^m$.		LOG. SINES, &c.				76 deg.		

0h 56m.				LOG. SINES, &c.			14 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	0	9.383675	10.616325	9.396771	10.603229	10.013096	9.986904	60	60
1	15	9.383802	10.616198	9.396906	10.603094	10.013104	9.986896	45	59
2	30	9.383928	10.616072	9.397040	10.602960	10.013112	9.986888	30	58
3	45	9.384055	10.615945	9.397174	10.602826	10.013120	9.986880	15	57
4	1	9.384181	10.615819	9.397309	10.602691	10.013127	9.986873	59	56
5	15	9.384308	10.615692	9.397443	10.602557	10.013135	9.986865	45	55
6	30	9.384434	10.615566	9.397578	10.602422	10.013143	9.986857	30	54
7	45	9.384561	10.615439	9.397712	10.602288	10.013151	9.986849	15	53
8	2	9.384687	10.615313	9.397846	10.602154	10.013159	9.986841	58	52
9	15	9.384814	10.615186	9.397980	10.602020	10.013167	9.986833	45	51
10	30	9.384940	10.615060	9.398115	10.601885	10.013175	9.986825	30	50
11	45	9.385066	10.614934	9.398249	10.601756	10.013183	9.986817	15	49
12	3	9.385192	10.614808	9.398383	10.601617	10.013191	9.986809	57	48
13	15	9.385319	10.614681	9.398517	10.601483	10.013199	9.986801	45	47
14	30	9.385445	10.614555	9.398651	10.601349	10.013206	9.986794	30	46
15	45	9.385571	10.614429	9.398785	10.601215	10.013214	9.986786	15	45
16	4	9.385697	10.614303	9.398919	10.601081	10.013222	9.986778	56	44
17	15	9.385823	10.614177	9.399053	10.600947	10.013230	9.986770	45	43
18	30	9.385949	10.614051	9.399187	10.600813	10.013238	9.986762	30	42
19	45	9.386075	10.613925	9.399321	10.600679	10.013246	9.986754	15	41
20	5	9.386201	10.613799	9.399455	10.600545	10.013254	9.986746	55	40
21	15	9.386327	10.613673	9.399588	10.600412	10.013262	9.986738	45	39
22	30	9.386452	10.613548	9.399722	10.600278	10.013270	9.986730	30	38
23	45	9.386578	10.613422	9.399856	10.600144	10.013278	9.986722	15	37
24	6	9.386704	10.613296	9.399990	10.600010	10.013286	9.986714	54	36
25	15	9.386830	10.613170	9.400123	10.599877	10.013294	9.986706	45	35
26	30	9.386955	10.613045	9.400257	10.599743	10.013301	9.986699	30	34
27	45	9.387081	10.612919	9.400390	10.599610	10.013309	9.986691	15	33
28	7	9.387207	10.612793	9.400524	10.599476	10.013317	9.986683	53	32
29	15	9.387332	10.612668	9.400657	10.599343	10.013325	9.986675	45	31
30	30	9.387458	10.612542	9.400791	10.599209	10.013333	9.986667	30	30
31	45	9.387583	10.612417	9.400924	10.599076	10.013341	9.986659	15	29
32	8	9.387709	10.612291	9.401058	10.598942	10.013349	9.986651	52	28
33	15	9.387834	10.612166	9.401191	10.598809	10.013357	9.986643	45	27
34	30	9.387959	10.612041	9.401324	10.598676	10.013365	9.986635	30	26
35	45	9.388085	10.611915	9.401458	10.598542	10.013373	9.986627	15	25
36	9	9.388210	10.611790	9.401591	10.598409	10.013381	9.986619	51	24
37	15	9.388335	10.611665	9.401724	10.598276	10.013389	9.986611	45	23
38	30	9.388461	10.611539	9.401857	10.598143	10.013397	9.986603	30	22
39	45	9.388586	10.611414	9.401991	10.598009	10.013405	9.986595	15	21
40	10	9.388711	10.611289	9.402124	10.597876	10.013413	9.986587	50	20
41	15	9.388836	10.611164	9.402257	10.597743	10.013421	9.986579	45	19
42	30	9.388961	10.611039	9.402390	10.597610	10.013429	9.986571	30	18
43	45	9.389086	10.610914	9.402523	10.597477	10.013437	9.986563	15	17
44	11	9.389211	10.610789	9.402656	10.597344	10.013445	9.986555	49	16
45	15	9.389336	10.610664	9.402789	10.597211	10.013453	9.986547	45	15
46	30	9.389461	10.610539	9.402922	10.597078	10.013461	9.986539	30	14
47	45	9.389586	10.610414	9.403054	10.596946	10.013469	9.986531	15	13
48	12	9.389711	10.610289	9.403187	10.596813	10.013477	9.986523	48	12
49	15	9.389835	10.610165	9.403320	10.596680	10.013485	9.986515	45	11
50	30	9 389960	10.610040	9.403453	10.596547	10.013493	9.986507	30	10
51	45	9.390085	10.609915	9.403585	10.596415	10.013501	9.986499	15	9
52	13	9.390210	10.609790	9.403718	10.596282	10.013509	9.986491	47	8
53	15	9.390334	10.609666	9.403851	10.596149	10.013517	9.986483	45	7
54	30	9.390459	10.609541	9.403983	10.596017	10.013525	9.986475	30	6
55	45	9.390583	10.609417	9.404116	10.595884	10.013533	9.986467	15	5
56	14	9.390708	10.609292	9.404249	10.595751	10.013541	9.986459	46	4
57	15	9.390832	10.609168	9.404381	10.595619	10.013549	9.986451	45	3
58	30	9.390957	10.609043	9.404514	10.595486	10.013557	9.986443	30	2
59	45	9.391081	10.608919	9.404646	10.595354	10.013565	9.986435	15	1
60	15	9.391206	10.608794	9.404778	10.595222	10.013573	9.986427	45	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
5h 3m.				LOG. SINES, &c.			75 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	$0^h\ 57^m$.		LOG. SINES, &c.				14 deg.		
0	15	9.391206	10.608794	9.404775	10.595222	10.013573	9.986427	45	60
1	15	9.391330	10.608670	9.404911	10.595089	10.013581	9.986419	45	59
2	30	9.391454	10.608546	9.405043	10.594957	10.013589	9.986411	30	58
3	45	9.391579	10.608421	9.405175	10.594825	10.013597	9.986403	15	57
4	16	9.391703	10.608297	9.405308	10.594692	10.013605	9.986395	44	56
5	15	9.391827	10.608173	9.405440	10.594560	10.013613	9.986387	45	55
6	30	9.391951	10.608049	9.405572	10.594428	10.013621	9.986379	30	54
7	45	9.392075	10.607925	9.405704	10.594296	10.013629	9.986371	15	53
8	17	9.392199	10.607801	9.405836	10.594164	10.013637	9.986363	43	52
9	15	9.392323	10.607677	9.405968	10.594032	10.013645	9.986355	45	51
10	30	9.392447	10.607553	9.406100	10.593900	10.013653	9.986347	30	50
11	45	9.392571	10.607429	9.406232	10.593768	10.013661	9.986339	15	49
12	18	9.392695	10.607305	9.406364	10.593636	10.013669	9.986331	42	48
13	15	9.392819	10.607181	9.406496	10.593504	10.013677	9.986323	45	47
14	30	9.392943	10.607057	9.406628	10.593372	10.013685	9.986315	30	46
15	45	9.393067	10.606933	9.406760	10.593240	10.013693	9.986307	15	45
16	19	9.393190	10.606810	9.406892	10.593108	10.013701	9.986299	41	44
17	15	9.393314	10.606686	9.407024	10.592976	10.013710	9.986290	45	43
18	30	9.393438	10.606562	9.407155	10.592845	10.013718	9.986282	30	42
19	45	9.393562	10.606438	9.407287	10.592713	10.013726	9.986274	15	41
20	20	9.393685	10.606315	9.407419	10.592581	10.013734	9.986266	40	40
21	15	9.393809	10.606191	9.407551	10.592449	10.013742	9.986258	45	39
22	30	9.393932	10.606068	9.407682	10.592318	10.013750	9.986250	30	38
23	45	9.394056	10.605944	9.407814	10.592186	10.013758	9.986242	15	37
24	21	9.394179	10.605821	9.407945	10.592055	10.013766	9.986234	39	36
25	15	9.394303	10.605697	9.408077	10.591923	10.013774	9.986226	45	35
26	30	9.394426	10.605574	9.408208	10.591792	10.013782	9.986218	30	34
27	45	9.394550	10.605450	9.408340	10.591660	10.013790	9.986210	15	33
28	22	9.394673	10.605327	9.408471	10.591529	10.013798	9.986202	38	32
29	15	9.394796	10.605204	9.408602	10.591398	10.013806	9.986194	45	31
30	30	9.394919	10.605081	9.408734	10.591266	10.013815	9.986185	30	30
31	45	9.395043	10.604957	9.408865	10.591135	10.013823	9.986177	15	29
32	23	9.395166	10.604834	9.408996	10.591004	10.013831	9.986169	37	28
33	15	9.395289	10.604711	9.409128	10.590872	10.013839	9.986161	45	27
34	30	9.395412	10.604588	9.409259	10.590741	10.013847	9.986153	30	26
35	45	9.395535	10.604465	9.409390	10.590610	10.013855	9.986145	15	25
36	24	9.395658	10.604342	9.409521	10.590479	10.013863	9.986137	36	24
37	15	9.395781	10.604219	9.409652	10.590348	10.013871	9.986129	45	23
38	30	9.395904	10.604096	9.409783	10.590217	10.013879	9.986121	30	22
39	45	9.396027	10.603973	9.409914	10.590086	10.013887	9.986113	15	21
40	25	9.396150	10.603850	9.410045	10.589955	10.013896	9.986104	35	20
41	15	9.396273	10.603727	9.410176	10.589824	10.013904	9.986096	45	19
42	30	9.396395	10.603605	9.410307	10.589693	10.013912	9.986088	30	18
43	45	9.396518	10.603482	9.410438	10.589562	10.013920	9.986080	15	17
44	26	9.396641	10.603359	9.410569	10.589431	10.013928	9.986072	34	16
45	15	9.396764	10.603236	9.410700	10.589300	10.013936	9.986064	45	15
46	30	9.396886	10.603114	9.410831	10.589169	10.013944	9.986056	30	14
47	45	9.397009	10.602991	9.410961	10.589039	10.013952	9.986048	15	13
48	27	9.397131	10.602869	9.411092	10.588908	10.013961	9.986039	33	12
49	15	9.397254	10.602746	9.411223	10.588777	10.013969	9.986031	45	11
50	30	9.397377	10.602623	9.411353	10.588647	10.013977	9.986023	30	10
51	45	9.397499	10.602501	9.411484	10.588516	10.013985	9.986015	15	9
52	28	9.397621	10.602379	9.411615	10.588385	10.013993	9.986007	32	8
53	15	9.397744	10.602256	9.411745	10.588255	10.014001	9.985999	45	7
54	30	9.397866	10.602134	9.411876	10.588124	10.014009	9.985991	30	6
55	45	9.397989	10.602011	9.412006	10.587994	10.014018	9.985982	15	5
56	29	9.398111	10.601889	9.412137	10.587863	10.014026	9.985974	31	4
57	15	9.398233	10.601767	9.412267	10.587733	10.014034	9.985966	45	3
58	30	9.398355	10.601645	9.412397	10.587603	10.014042	9.985958	30	2
59	45	9.398477	10.601523	9.412528	10.587472	10.014050	9.985950	15	1
60	30	9.398600	10.601400	9.412658	10.587342	10.014058	9.985942	30	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$5^h\ 2^m$.		LOG. SINES, &c.				75 deg.		

sec.	0h 58m. ′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	LOG. SINES, &c.							14 deg.	
0	30	9.398600	10.601400	9.412658	10.587342	10.014058	9.985942	30	60
1	15	9.398722	10.601278	9.412788	10.587212	10.014067	9.985933	45	59
2	30	9.398844	10.601156	9.412919	10.587081	10.014075	9.985925	30	58
3	45	9.398966	10.601034	9.413049	10.586951	10.014083	9.985917	15	57
4	31	9.399088	10.600912	9.413179	10.586821	10.014091	9.985909	29	56
5	15	9.399210	10.600790	9.413309	10.586691	10.014099	9.985901	45	55
6	30	9.399332	10.600668	9.413439	10.586561	10.014108	9.985892	30	54
7	45	9.399454	10.600546	9.413569	10.586431	10.014116	9.985884	15	53
8	32	9.399575	10.600425	9.413699	10.586301	10.014124	9.985876	28	52
9	15	9.399697	10.600303	9.413829	10.586171	10.014132	9.985868	45	51
10	30	9.399819	10.600181	9.413959	10.586041	10.014140	9.985860	30	50
11	45	9.399941	10.600059	9.414089	10.585911	10.014148	9.985852	15	49
12	33	9.400062	10.599938	9.414219	10.585781	10.014157	9.985843	27	48
13	15	9.400184	10.599816	9.414349	10.585651	10.014165	9.985835	45	47
14	30	9.400306	10.599694	9.414479	10.585521	10.014173	9.985827	30	46
15	45	9.400427	10.599573	9.414609	10.585391	10.014181	9.985819	15	45
16	34	9.400549	10.599451	9.414738	10.585262	10.014189	9.985811	26	44
17	15	9.400670	10.599330	9.414868	10.585132	10.014198	9.985802	45	43
18	30	9.400792	10.599208	9.414998	10.585002	10.014206	9.985794	30	42
19	45	9.400913	10.599087	9.415127	10.584873	10.014214	9.985786	15	41
20	35	9.401035	10.598965	9.415257	10.584743	10.014222	9.985778	25	40
21	15	9.401156	10.598844	9.415387	10.584613	10.014231	9.985769	45	39
22	30	9.401277	10.598723	9.415516	10.584484	10.014239	9.985761	30	38
23	45	9.401399	10.598601	9.415646	10.584354	10.014247	9.985753	15	37
24	36	9.401520	10.598480	9.415775	10.584225	10.014255	9.985745	24	36
25	15	9.401641	10.598359	9.415905	10.584095	10.014263	9.985737	45	35
26	30	9.401762	10.598238	9.416034	10.583966	10.014272	9.985728	30	34
27	45	9.401884	10.598116	9.416163	10.583837	10.014280	9.985720	15	33
28	37	9.402005	10.597995	9.416293	10.583707	10.014288	9.985712	23	32
29	15	9.402126	10.597874	9.416422	10.583578	10.014296	9.985704	45	31
30	30	9.402247	10.597753	9.416551	10.583449	10.014305	9.985695	30	30
31	45	9.402368	10.597632	9.416681	10.583319	10.014313	9.985687	15	29
32	38	9.402489	10.597511	9.416810	10.583190	10.014321	9.985679	22	28
33	15	9.402610	10.597390	9.416939	10.583061	10.014329	9.985671	45	27
34	30	9.402731	10.597269	9.417068	10.582932	10.014338	9.985662	30	26
35	45	9.402852	10.597148	9.417197	10.582803	10.014346	9.985654	15	25
36	39	9.402972	10.597028	9.417326	10.582674	10.014354	9.985646	21	24
37	15	9.403093	10.596907	9.417455	10.582545	10.014362	9.985638	45	23
38	30	9.403214	10.596786	9.417585	10.582415	10.014371	9.985629	30	22
39	45	9.403335	10.596665	9.417713	10.582287	10.014379	9.985621	15	21
40	40	9.403455	10.596545	9.417842	10.582158	10.014387	9.985613	20	20
41	15	9.403576	10.596424	9.417971	10.582029	10.014395	9.985605	45	19
42	30	9.403697	10.596303	9.418100	10.581900	10.014404	9.985596	30	18
43	45	9.403817	10.596183	9.418229	10.581771	10.014412	9.985588	15	17
44	41	9.403938	10.596062	9.418358	10.581642	10.014420	9.985580	19	16
45	15	9.404058	10.595942	9.418487	10.581513	10.014428	9.985572	45	15
46	30	9.404179	10.595821	9.418615	10.581385	10.014437	9.985563	30	14
47	45	9.404299	10.595701	9.418744	10.581256	10.014445	9.985555	15	13
48	42	9.404420	10.595580	9.418873	10.581127	10.014453	9.985547	18	12
49	15	9.404540	10.595460	9.419002	10.580998	10.014462	9.985538	45	11
50	30	9.404660	10.595340	9.419130	10.580870	10.014470	9.985530	30	10
51	45	9.404781	10.595219	9.419259	10.580741	10.014478	9.985522	15	9
52	43	9.404901	10.595099	9.419387	10.580613	10.014487	9.985513	17	8
53	15	9.405021	10.594979	9.419516	10.580484	10.014495	9.985505	45	7
54	30	9.405141	10.594859	9.419644	10.580356	10.014503	9.985497	30	6
55	45	9.405261	10.594739	9.419773	10.580227	10.014511	9.985489	15	5
56	44	9.405382	10.594618	9.419901	10.580099	10.014520	9.985480	16	4
57	15	9.405502	10.594498	9.420030	10.579970	10.014528	9.985472	45	3
58	30	9.405622	10.594378	9.420158	10.579842	10.014536	9.985464	30	2
59	45	9.405742	10.594258	9.420286	10.579714	10.014545	9.985455	15	1
60	45	9.405862	10.594138	9.420415	10.579585	10.014553	9.985447	15	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	5h 1m.			LOG. SINES, &c.				75 deg.	

0h 59m.				LOG. SINES, &c.			14 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	45	9.405862	10.594138	9.420415	10.579585	10.014553	9.985447	15	60
1	15	9.405982	10.594018	9.420543	10.579457	10.014561	9.985439	45	59
2	30	9.406102	10.593898	9.420671	10.579329	10.014570	9.985430	30	58
3	45	9.406221	10.593779	9.420799	10.579201	10.014578	9.985422	15	57
4	46	9.406341	10.593659	9.420927	10.579073	10.014586	9.985414	14	56
5	15	9.406461	10.593539	9.421056	10.578944	10.014595	9.985405	45	55
6	30	9.406581	10.593419	9.421184	10.578816	10.014603	9.985397	30	54
7	45	9.406701	10.593299	9.421312	10.578688	10.014611	9.985389	15	53
8	47	9.406820	10.593180	9.421440	10.578560	10.014620	9.985380	13	52
9	15	9.406940	10.593060	9.421568	10.578432	10.014628	9.985372	45	51
10	30	9.407060	10.592940	9.421696	10.578304	10.014636	9.985364	30	50
11	45	9.407179	10.592821	9.421824	10.578176	10.014645	9.985355	15	49
12	48	9.407299	10.592701	9.421951	10.578049	10.014653	9.985347	12	48
13	15	9.407418	10.592582	9.422079	10.577921	10.014661	9.985339	45	47
14	30	9.407538	10.592462	9.422207	10.577793	10.014670	9.985330	30	46
15	45	9.407657	10.592343	9.422335	10.577665	10.014678	9.985322	15	45
16	49	9.407777	10.592223	9.422463	10.577537	10.014686	9.985314	11	44
17	15	9.407896	10.592104	9.422590	10.577410	10.014695	9.985305	45	43
18	30	9.408015	10.591985	9.422718	10.577282	10.014703	9.985297	30	42
19	45	9.408135	10.591865	9.422846	10.577154	10.014711	9.985289	15	41
20	50	9.408254	10.591746	9.422973	10.577027	10.014720	9.985280	10	40
21	15	9.408373	10.591627	9.423101	10.576899	10.014728	9.985272	45	39
22	30	9.408492	10.591508	9.423229	10.576771	10.014736	9.985264	30	38
23	45	9.408611	10.591389	9.423356	10.576644	10.014745	9.985255	15	37
24	51	9.408731	10.591269	9.423484	10.576516	10.014753	9.985247	9	36
25	15	9.408850	10.591150	9.423611	10.576389	10.014762	9.985238	45	35
26	30	9.408969	10.591031	9.423739	10.576261	10.014770	9.985230	30	34
27	45	9.409088	10.590912	9.423866	10.576134	10.014778	9.985222	15	33
28	52	9.409207	10.590793	9.423993	10.576007	10.014787	9.985213	8	32
29	15	9.409326	10.590674	9.424121	10.575879	10.014795	9.985205	45	31
30	30	9.409445	10.590555	9.424248	10.575752	10.014804	9.985196	30	30
31	45	9.409563	10.590437	9.424375	10.575625	10.014812	9.985188	15	29
32	53	9.409682	10.590318	9.424503	10.575497	10.014820	9.985180	7	28
33	15	9.409801	10.590199	9.424630	10.575370	10.014829	9.985171	45	27
34	30	9.409920	10.590080	9.424757	10.575243	10.014837	9.985163	30	26
35	45	9.410039	10.589961	9.424884	10.575116	10.014845	9.985155	15	25
36	54	9.410157	10.589843	9.425011	10.574989	10.014854	9.985146	6	24
37	15	9.410276	10.589724	9.425138	10.574862	10.014862	9.985138	45	23
38	30	9.410395	10.589605	9.425265	10.574735	10.014871	9.985129	30	22
39	45	9.410513	10.589487	9.425392	10.574608	10.014879	9.985121	15	21
40	55	9.410632	10.589368	9.425519	10.574481	10.014888	9.985112	5	20
41	15	9.410750	10.589250	9.425646	10.574354	10.014896	9.985104	45	19
42	30	9.410869	10.589131	9.425773	10.574227	10.014904	9.985096	30	18
43	45	9.410987	10.589013	9.425900	10.574100	10.014913	9.985087	15	17
44	56	9.411106	10.588894	9.426027	10.573973	10.014921	9.985079	4	16
45	15	9.411224	10.588776	9.426154	10.573846	10.014930	9.985070	45	15
46	30	9.411343	10.588657	9.426281	10.573719	10.014938	9.985062	30	14
47	45	9.411461	10.588539	9.426407	10.573593	10.014946	9.985054	15	13
48	57	9.411579	10.588421	9.426534	10.573466	10.014955	9.985045	3	12
49	15	9.411698	10.588302	9.426661	10.573339	10.014963	9.985037	45	11
50	30	9.411816	10.588184	9.426787	10.573213	10.014972	9.985028	30	10
51	45	9.411934	10.588066	9.426914	10.573086	10.014980	9.985020	15	9
52	58	9.412052	10.587948	9.427041	10.572959	10.014989	9.985011	2	8
53	15	9.412170	10.587830	9.427167	10.572833	10.014997	9.985003	45	7
54	30	9.412288	10.587712	9.427294	10.572706	10.015006	9.984994	30	6
55	45	9.412406	10.587594	9.427420	10.572580	10.015014	9.984986	15	5
56	59	9.412524	10.587476	9.427547	10.572453	10.015022	9.984978	1	4
57	15	9.412642	10.587358	9.427673	10.572327	10.015031	9.984969	45	3
58	30	9.412760	10.587240	9.427800	10.572200	10.015039	9.984961	30	2
59	45	9.412878	10.587122	9.427926	10.572074	10.015048	9.984952	15	1
60	60	9.412996	10.587004	9.428052	10.571948	10.015056	9.984944	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
5h 0m.				LOG. SINES, &c.			75 deg.		

1h 0m.			LOG. SINES, &c.			15 deg.			
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″	sec.
0	0	9.412996	10.587004	9.428052	10.571948	10.015056	9.984944	60	60
1	15	9.413114	10.586886	9.428179	10.571821	10.015065	9.984935	45	59
2	30	9.413232	10.586768	9.428305	10.571695	10.015073	9.984927	30	58
3	45	9.413350	10.586650	9.428431	10.571569	10.015082	9.984918	15	57
4	1	9.413467	10.586533	9.428557	10.571443	10.015090	9.984910	59	56
5	15	9.413585	10.586415	9.428684	10.571316	10.015099	9.984901	45	55
6	30	9.413703	10.586297	9.428810	10.571190	10.015107	9.984893	30	54
7	45	9.413821	10.586179	9.428936	10.571064	10.015116	9.984884	15	53
8	2	9.413938	10.586062	9.429062	10.570938	10.015124	9.984876	58	52
9	15	9.414056	10.585944	9.429188	10.570812	10.015133	9.984867	45	51
10	30	9.414173	10.585827	9.429314	10.570686	10.015141	9.984859	30	50
11	45	9.414291	10.585709	9.429440	10.570560	10.015150	9.984850	15	49
12	3	9.414408	10.585592	9.429566	10.570434	10.015158	9.984842	57	48
13	15	9.414526	10.585474	9.429692	10.570308	10.015166	9.984834	45	47
14	30	9.414643	10.585357	9.429818	10.570182	10.015175	9.984825	30	46
15	45	9.414760	10.585240	9.429944	10.570056	10.015183	9.984817	15	45
16	4	9.414878	10.585122	9.430070	10.569930	10.015192	9.984808	56	44
17	15	9.414995	10.585005	9.430195	10.569805	10.015200	9.984800	45	43
18	30	9.415112	10.584888	9.430321	10.569679	10.015209	9.984791	30	42
19	45	9.415230	10.584770	9.430447	10.569553	10.015218	9.984782	15	41
20	5	9.415347	10.584653	9.430573	10.569427	10.015226	9.984774	55	40
21	15	9.415464	10.584536	9.430698	10.569302	10.015235	9.984765	45	39
22	30	9.415581	10.584419	9.430824	10.569176	10.015243	9.984757	30	38
23	45	9.415698	10.584302	9.430950	10.569050	10.015252	9.984748	15	37
24	6	9.415815	10.584185	9.431075	10.568925	10.015260	9.984740	54	36
25	15	9.415932	10.584068	9.431201	10.568799	10.015269	9.984731	45	35
26	30	9.416049	10.583951	9.431326	10.568674	10.015277	9.984723	30	34
27	45	9.416166	10.583834	9.431452	10.568548	10.015286	9.984714	15	33
28	7	9.416283	10.583717	9.431577	10.568423	10.015294	9.984706	53	32
29	15	9.416400	10.583600	9.431703	10.568297	10.015303	9.984697	45	31
30	30	9.416517	10.583483	9.431828	10.568172	10.015311	9.984689	30	30
31	45	9.416634	10.583366	9.431953	10.568047	10.015320	9.984680	15	29
32	8	9.416751	10.583249	9.432079	10.567921	10.015328	9.984672	52	28
33	15	9.416867	10.583133	9.432204	10.567796	10.015337	9.984663	45	27
34	30	9.416984	10.583016	9.432329	10.567671	10.015345	9.984655	30	26
35	45	9.417101	10.582899	9.432455	10.567545	10.015354	9.984646	15	25
36	9	9.417217	10.582783	9.432580	10.567420	10.015363	9.984637	51	24
37	15	9.417334	10.582666	9.432705	10.567295	10.015371	9.984629	45	23
38	30	9.417451	10.582549	9.432830	10.567170	10.015380	9.984620	30	22
39	45	9.417567	10.582433	9.432955	10.567045	10.015388	9.984612	15	21
40	10	9.417684	10.582316	9.433080	10.566920	10.015397	9.984603	50	20
41	15	9.417800	10.582200	9.433205	10.566795	10.015405	9.984595	45	19
42	30	9.417917	10.582083	9.433330	10.566670	10.015414	9.984586	30	18
43	45	9.418033	10.581967	9.433455	10.566545	10.015422	9.984578	15	17
44	11	9.418149	10.581851	9.433580	10.566420	10.015431	9.984569	49	16
45	15	9.418266	10.581734	9.433705	10.566295	10.015440	9.984560	45	15
46	30	9.418382	10.581618	9.433830	10.566170	10.015448	9.984552	30	14
47	45	9.418498	10.581502	9.433955	10.566045	10.015457	9.984543	15	13
48	12	9.418615	10.581385	9.434080	10.565920	10.015465	9.984535	48	12
49	15	9.418731	10.581269	9.434205	10.565795	10.015474	9.984526	45	11
50	30	9.418847	10.581153	9.434330	10.565670	10.015482	9.984518	30	10
51	45	9.418963	10.581037	9.434454	10.565546	10.015491	9.984509	15	9
52	13	9.419079	10.580921	9.434579	10.565421	10.015500	9.984500	47	8
53	15	9.419196	10.580804	9.434704	10.565296	10.015508	9.984492	45	7
54	30	9.419312	10.580688	9.434828	10.565172	10.015517	9.984483	30	6
55	45	9.419428	10.580572	9.434953	10.565047	10.015525	9.984475	15	5
56	14	9.419544	10.580456	9.435078	10.564922	10.015534	9.984466	46	4
57	15	9.419660	10.580340	9.435202	10.564798	10.015543	9.984457	45	3
58	30	9.419775	10.580225	9.435327	10.564673	10.015551	9.984449	30	2
59	45	9.419891	10.580109	9.435451	10.564549	10.015560	9.984440	15	1
60	15	9.420007	10.579993	9.435576	10.564424	10.015568	9.984432	45	0
sec.	′ ″	cosine.	secant.	cotangent	tangent.	cosecant.	sine.	″ ′	sec.
4h 59m.			LOG. SINES, &c.				74 deg.		

sec.	1h 1m. ′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	LOG. SINES, &c.							15 deg.	
0	15	9.420007	10.579993	9.435576	10.564424	10.015568	9.984432	45	60
1	15	9.420123	10.579877	9.435700	10.564300	10.015577	9.984423	45	59
2	30	9.420239	10.579761	9.435824	10.564176	10.015586	9.984414	30	58
3	45	9.420355	10.579645	9.435949	10.564051	10.015594	9.984406	15	57
4	16	9.420470	10.579530	9.436073	10.563927	10.015603	9.984397	44	56
5	15	9.420586	10.579414	9.436198	10.563802	10.015612	9.984388	45	55
6	30	9.420702	10.579298	9.436322	10.563678	10.015620	9.984380	30	54
7	45	9.420817	10.579183	9.436446	10.563554	10.015629	9.984371	15	53
8	17	9.420933	10.579067	9.436570	10.563430	10.015637	9.984363	43	52
9	15	9.421048	10.578952	9.436695	10.563305	10.015646	9.984354	45	51
10	30	9.421164	10.578836	9.436819	10.563181	10.015655	9.984345	30	50
11	45	9.421280	10.578720	9.436943	10.563057	10.015663	9.984337	15	49
12	18	9.421395	10.578605	9.437067	10.562933	10.015672	9.984328	42	48
13	15	9.421510	10.578490	9.437191	10.562809	10.015681	9.984319	45	47
14	30	9.421626	10.578374	9.437315	10.562685	10.015689	9.984311	30	46
15	45	9.421741	10.578259	9.437439	10.562561	10.015698	9.984302	15	45
16	19	9.421857	10.578143	9.437563	10.562437	10.015707	9.984293	41	44
17	15	9.421972	10.578028	9.437687	10.562313	10.015715	9.984285	45	43
18	30	9.422087	10.577913	9.437811	10.562189	10.015724	9.984276	30	42
19	45	9.422202	10.577798	9.437935	10.562065	10.015733	9.984267	15	41
20	20	9.422318	10.577682	9.438059	10.561941	10.015741	9.984259	40	40
21	15	9.422433	10.577567	9.438182	10.561818	10.015750	9.984250	45	39
22	30	9.422548	10.577452	9.438306	10.561694	10.015758	9.984242	30	38
23	45	9.422663	10.577337	9.438430	10.561570	10.015767	9.984233	15	37
24	21	9.422778	10.577222	9.438554	10.561446	10.015776	9.984224	39	36
25	15	9.422893	10.577107	9.438677	10.561323	10.015784	9.984216	45	35
26	30	9.423008	10.576992	9.438801	10.561199	10.015793	9.984207	30	34
27	45	9.423123	10.576877	9.438925	10.561075	10.015802	9.984198	15	33
28	22	9.423238	10.576762	9.439048	10.560952	10.015811	9.984189	38	32
29	15	9.423353	10.576647	9.439172	10.560828	10.015819	9.984181	45	31
30	30	9.423468	10.576532	9.439296	10.560704	10 015828	9.984172	30	30
31	45	9.423583	10.576417	9.439419	10.560581	10.015837	9.984163	15	29
32	23	9.423697	10.576303	9.439543	10.560457	10.015845	9.984155	37	28
33	15	9.423812	10.576188	9.439666	10.560334	10.015854	9.984146	45	27
34	30	9.423927	10.576073	9.439789	10.560211	10.015863	9.984137	30	26
35	45	9.424042	10.575958	9.439913	10.560087	10.015871	9.984129	15	25
36	24	9.424156	10.575844	9.440036	10.559964	10.015880	9.984120	36	24
37	15	9.424271	10.575729	9.440160	10.559840	10.015889	9.984111	45	23
38	30	9.424386	10.575614	9.440283	10.559717	10.015897	9.984103	30	22
39	45	9.424500	10.575500	9.440406	10.559594	10.015906	9.984094	15	21
40	25	9.424615	10.575385	9.440529	10.559471	10.015915	9.984085	35	20
41	15	9.424729	10.575271	9.440653	10.559347	10.015924	9.984076	45	19
42	30	9.424844	10.575156	9.440776	10.559224	10.015932	9.984068	30	18
43	45	9.424958	10.575042	9.440899	10.559101	10.015941	9.984059	15	17
44	26	9.425073	10.574927	9.441022	10.558978	10.015950	9.984050	34	16
45	15	9.425187	10.574813	9.441145	10.558855	10.015958	9.984042	45	15
46	30	9.425301	10.574699	9.441268	10.558732	10.015967	9.984033	30	14
47	45	9.425416	10.574584	9.441391	10.558609	10.015976	9.984024	15	13
48	27	9.425530	10.574470	9.441514	10.558486	10.015985	9.984015	33	12
49	15	9.425644	10.574356	9.441637	10.558363	10.015993	9.984007	45	11
50	30	9.425758	10.574242	9.441760	10.558240	10.016002	9.983998	30	10
51	45	9.425873	10.574127	9.441883	10.558117	10.016011	9.983989	15	9
52	28	9.425987	10.574013	9.442006	10.557994	10.016020	9.983980	32	8
53	15	9.426101	10.573899	9.442129	10.557871	10.016028	9.983972	45	7
54	30	9.426215	10.573785	9.442252	10.557748	10.016037	9.983963	30	6
55	45	9.426329	10.573671	9.442375	10.557625	10.016046	9.983954	15	5
56	29	9.426443	10.573557	9.442497	10.557503	10.016055	9.983945	31	4
57	15	9.426557	10.573443	9.442620	10.557380	10.016063	9.983937	45	3
58	30	9.426671	10.573329	9.442743	10.557257	10.016072	9.983928	30	2
59	45	9.426785	10.573215	9.442866	10.557134	10.016081	9.983919	15	1
60	30	9.426899	10.573101	9.442988	10.557012	10.016090	9.983910	30	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	4h 58m.			LOG. SINES, &c.				74 deg.	

$1^h\ 2^m$.		LOG. SINES, &c.					15 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	30	9.426899	10.573101	9.442988	10.557012	10.016090	9.983910	30	60
1	15	9.427013	10.572987	9.443111	10.556889	10.016098	9.983902	45	59
2	30	9.427126	10.572874	9.443233	10.556767	10.016107	9.983893	30	58
3	45	9.427240	10.572760	9.443356	10.556644	10.016116	9.983884	15	57
4	31	9.427354	10.572646	9.443479	10.556521	10.016125	9.983875	29	56
5	15	9.427468	10.572532	9.443601	10.556399	10.016133	9.983867	45	55
6	30	9.427581	10.572419	9.443724	10.556276	10.016142	9.983858	30	54
7	45	9.427695	10.572305	9.443846	10.556154	10.016151	9.983849	15	53
8	32	9.427809	10.572191	9.443968	10.556032	10.016160	9.983840	28	52
9	15	9.427922	10.572078	9.444091	10.555909	10.016168	9.983832	45	51
10	30	9.428036	10.571964	9.444213	10.555787	10.016177	9.983823	30	50
11	45	9.428150	10.571850	9.444336	10.555664	10.016186	9.983814	15	49
12	33	9.428263	10.571737	9.444458	10.555542	10.016195	9.983805	27	48
13	15	9.428377	10.571623	9.444580	10.555420	10.016204	9.983796	45	47
14	30	9.428490	10.571510	9.444702	10.555298	10.016212	9.983788	30	46
15	45	9.428603	10.571397	9.444825	10.555175	10.016221	9.983779	15	45
16	34	9.428717	10.571283	9.444947	10.555053	10.016230	9.983770	26	44
17	15	9.428830	10.571170	9.445069	10.554931	10.016239	9.983761	45	43
18	30	9.428943	10.571057	9.445191	10.554809	10.016248	9.983752	30	42
19	45	9.429057	10.570943	9.445313	10.554687	10.016256	9.983744	15	41
20	35	9.429170	10.570830	9.445435	10.554565	10.016265	9.983735	25	40
21	15	9.429283	10.570717	9.445557	10.554443	10.016274	9.983726	45	39
22	30	9.429396	10.570604	9.445679	10.554321	10.016283	9.983717	30	38
23	45	9.429510	10.570490	9.445801	10.554199	10.016292	9.983708	15	37
24	36	9.429623	10.570377	9.445923	10.554077	10.016300	9.983700	24	36
25	15	9.429736	10.570264	9.446045	10.553955	10.016309	9.983691	45	35
26	30	9.429849	10.570151	9.446167	10.553833	10.016318	9.983682	30	34
27	45	9.429962	10.570038	9.446289	10.553711	10.016327	9.983673	15	33
28	37	9.430075	10.569925	9.446411	10.553589	10.016336	9.983664	23	32
29	15	9.430188	10.569812	9.446532	10.553468	10.016345	9.983655	45	31
30	30	9.430301	10.569699	9.446654	10.553346	10.016353	9.983647	30	30
31	45	9.430414	10.569586	9.446776	10.553224	10.016362	9.983638	15	29
32	38	9.430527	10.569473	9.446898	10.553102	10.016371	9.983629	22	28
33	15	9.430640	10.569360	9.447019	10.552981	10.016380	9.983620	45	27
34	30	9.430752	10.569248	9.447141	10.552859	10.016389	9.983611	30	26
35	45	9.430865	10.569135	9.447263	10.552737	10.016398	9.983602	15	25
36	39	9.430978	10.569022	9.447384	10.552616	10.016406	9 983594	21	24
37	15	9.431091	10.568909	9.447506	10.552494	10.016415	9.983585	45	23
38	30	9.431203	10.568797	9.447627	10.552373	10.016424	9.983576	30	22
39	45	9.431316	10.568684	9.447749	10.552251	10.016433	9.983567	15	21
40	40	9.431429	10.568571	9.447870	10.552130	10.016442	9.983558	20	20
41	15	9.431541	10.568459	9.447992	10.552008	10.016451	9.983549	45	19
42	30	9.431654	10.568346	9.448113	10.551887	10.016460	9.983540	30	18
43	45	9.431766	10.568234	9.448235	10.551765	10.016468	9.983532	15	17
44	41	9.431879	10.568121	9.448356	10.551644	10.016477	9.983523	19	16
45	15	9.431991	10.568009	9.448477	10.551523	10.016486	9.983514	45	15
46	30	9.432104	10.567896	9.448599	10.551401	10.016495	9.983505	30	14
47	45	9.432216	10.567784	9.448720	10.551280	10.016504	9.983496	15	13
48	42	9.432328	10.567672	9.448841	10.551159	10.016513	9.983487	18	12
49	15	9.432441	10.567559	9.448962	10.551038	10.016522	9.983478	45	11
50	30	9.432553	10.567447	9.449084	10.550916	10.016531	9.983469	30	10
51	45	9.432665	10.567335	9.449205	10.550795	10.016539	9.983461	15	9
52	43	9.432778	10.567222	9.449326	10.550674	10.016548	9.983452	17	8
53	15	9.432890	10.567110	9.449447	10.550553	10.016557	9.983443	45	7
54	30	9.433002	10.566998	9.449568	10.550432	10.016566	9.983434	30	6
55	45	9.433114	10.566886	9.449689	10.550311	10.016575	9.983425	15	5
56	44	9.433226	10.566774	9.449810	10.550190	10.016584	9.983416	16	4
57	15	9.433338	10.566662	9.449931	10.550069	10.016593	9.983407	45	3
58	30	9.433450	10.566550	9.450052	10.549948	10.016602	9.983398	30	2
59	45	9.433563	10.566437	9.450173	10.549827	10.016611	9.983389	15	1
60	45	9.433675	10.566325	9.450294	10.549706	10.016620	9.983380	15	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
$4^h\ 57^m$.		LOG. SINES, &c.					74 deg		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	1h 3m.			LOG. SINES, &c.			15 deg.		
0	45	9.433675	10.566325	9.450294	10.549706	10.016620	9.983380	15	60
1	15	9.433786	10.566214	9.450415	10.549585	10.016628	9.983372	45	59
2	30	9.433898	10.566102	9.450536	10.549464	10.016637	9.983363	30	58
3	45	9.434010	10.565990	9.450657	10.549343	10.016646	9.983354	15	57
4	46	9.434122	10.565878	9.450777	10.549223	10.016655	9.983345	14	56
5	15	9.434234	10.565766	9.450898	10.549102	10.016664	9.983336	45	55
6	30	9.434346	10.565654	9.451019	10.548981	10.016673	9.983327	30	54
7	45	9.434458	10.565542	9.451140	10.548860	10.016682	9.983318	15	53
8	47	9.434569	10.565431	9.451260	10.548740	10.016691	9.983309	13	52
9	15	9.434681	10.565319	9.451381	10.548619	10.016700	9.983300	45	51
10	30	9.434793	10.565207	9.451501	10.548499	10.016709	9.983291	30	50
11	45	9.434904	10.565096	9.451622	10.548378	10.016718	9.983282	15	49
12	48	9.435016	10.564984	9.451743	10.548257	10.016727	9.983273	12	48
13	15	9.435128	10.564872	9.451863	10.548137	10.016736	9.983264	45	47
14	30	9.435239	10.564761	9.451984	10.548016	10.016744	9.983256	30	46
15	45	9.435351	10.564649	9.452104	10.547896	10.016753	9.983247	15	45
16	49	9.435462	10.564538	9.452225	10.547775	10.016762	9.983238	11	44
17	15	9.435574	10.564426	9.452345	10.547655	10.016771	9.983229	45	43
18	30	9.435685	10.564315	9.452465	10.547535	10.016780	9.983220	30	42
19	45	9.435797	10.564203	9.452586	10.547414	10.016789	9.983211	15	41
20	50	9.435908	10.564092	9.452706	10.547294	10.016798	9.983202	10	40
21	15	9.436019	10.563981	9.452826	10.547174	10.016807	9.983193	45	39
22	30	9.436131	10.563869	9.452947	10.547053	10.016816	9.983184	30	38
23	45	9.436242	10.563758	9.453067	10.546933	10.016825	9.983175	15	37
24	51	9.436353	10.563647	9.453187	10.546813	10.016834	9.983166	9	36
25	15	9.436464	10.563536	9.453307	10.546693	10.016843	9.983157	45	35
26	30	9.436576	10.563424	9.453428	10.546572	10.016852	9.983148	30	34
27	45	9.436687	10.563313	9.453548	10.546452	10.016861	9.983139	15	33
28	52	9.436798	10.563202	9.453668	10.546332	10.016870	9.983130	8	32
29	15	9.436909	10.563091	9.453788	10.546212	10.016879	9.983121	45	31
30	30	9.437020	10.562980	9.453908	10.546092	10.016888	9.983112	30	30
31	45	9.437131	10.562869	9.454028	10.545972	10.016897	9.983103	15	29
32	53	9.437242	10.562758	9.454148	10.545852	10.016906	9.983094	7	28
33	15	9.437353	10.562647	9.454268	10.545732	10.016915	9.983085	45	27
34	30	9.437464	10.562536	9.454388	10.545612	10.016924	9.983076	30	26
35	45	9.437575	10.562425	9.454508	10.545492	10.016933	9.983067	15	25
36	54	9.437686	10.562314	9.454628	10.545372	10.016942	9.983058	6	24
37	15	9.437797	10.562203	9.454747	10.545253	10.016951	9.983049	45	23
38	30	9.437908	10.562092	9.454867	10.545133	10.016960	9.983040	30	22
39	45	9.438018	10.561982	9.454987	10.545013	10.016969	9.983031	15	21
40	55	9.438129	10.561871	9.455107	10.544893	10.016978	9.983022	5	20
41	15	9.438240	10.561760	9.455227	10.544773	10.016987	9.983013	45	19
42	30	9.438351	10.561649	9.455346	10.544654	10.016996	9.983004	30	18
43	45	9.438461	10.561539	9.455466	10.544534	10.017005	9.982995	15	17
44	56	9.438572	10.561428	9.455586	10.544414	10.017014	9.982986	4	16
45	15	9.438682	10.561318	9.455705	10.544295	10.017023	9.982977	45	15
46	30	9.438793	10.561207	9.455825	10.544175	10.017032	9.982968	30	14
47	45	9.438904	10.561096	9.455944	10.544056	10.017041	9.982959	15	13
48	57	9.439014	10.560986	9.456064	10.543936	10.017050	9.982950	3	12
49	15	9.439125	10.560875	9.456184	10.543816	10.017059	9.982941	45	11
50	30	9.439235	10.560765	9.456303	10.543697	10.017068	9.982932	30	10
51	45	9.439346	10.560654	9.456422	10.543578	10.017077	9.982923	15	9
52	58	9.439456	10.560544	9.456542	10.543458	10.017086	9.982914	2	8
53	15	9.439566	10.560434	9.456661	10.543339	10.017095	9.982905	45	7
54	30	9.439677	10.560323	9.456781	10.543219	10.017104	9.982896	30	6
55	45	9.439787	10.560213	9.456900	10.543100	10.017113	9.982887	15	5
56	59	9.439897	10.560103	9.457019	10.542981	10.017122	9.982878	1	4
57	15	9.440007	10.559993	9.457139	10.542861	10.017131	9.982869	45	3
58	30	9.440118	10.559882	9.457258	10.542742	10.017140	9.982860	30	2
59	45	9.440228	10.559772	9.457377	10.542623	10.017149	9.982851	15	1
60	60	9.440338	10.559662	9.457496	10.542504	10.017158	9.982842	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	4h 56m.			LOG. SINES, &c.			74 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	1h 4m.		LOG. SINES, &c.					16 deg.	
0	0	9.440338	10.559662	9.457496	10.542504	10.017158	9.982842	60	60
1	15	9.440448	10.559552	9.457616	10.542384	10.017167	9.982833	45	59
2	30	9.440558	10.559442	9.457735	10.542265	10.017177	9.982823	30	58
3	45	9.440668	10.559332	9.457854	10.542146	10.017186	9.982814	15	57
4	1	9.440778	10.559222	9.457973	10.542027	10.017195	9.982805	59	56
5	15	9.440888	10.559112	9.458092	10.541908	10.017204	9.982796	45	55
6	30	9.440998	10.559002	9.458211	10.541789	10.017213	9.982787	30	54
7	45	9.441108	10.558892	9.458330	10.541670	10.017222	9.982778	15	53
8	2	9.441218	10.558782	9.458449	10.541551	10.017231	9.982769	58	52
9	15	9.441328	10.558672	9.458568	10.541432	10.017240	9.982760	45	51
10	30	9.441438	10.558562	9.458687	10.541313	10.017249	9.982751	30	50
11	45	9.441548	10.558452	9.458806	10.541194	10.017258	9.982742	15	49
12	3	9.441658	10.558342	9.458925	10.541075	10.017267	9.982733	57	48
13	15	9.441767	10.558233	9.459044	10.540956	10.017276	9.982724	45	47
14	30	9.441877	10.558123	9.459162	10.540838	10.017285	9.982715	30	46
15	45	9.441987	10.558013	9.459281	10.540719	10.017295	9.982705	15	45
16	4	9.442096	10.557904	9.459400	10.540600	10.017304	9.982696	56	44
17	15	9.442206	10.557794	9.459519	10.540481	10.017313	9.982687	45	43
18	30	9.442316	10.557684	9.459637	10.540363	10.017322	9.982678	30	42
19	45	9.442425	10.557575	9.459756	10.540244	10.017331	9.982669	15	41
20	5	9.442535	10.557465	9.459875	10.540125	10.017340	9.982660	55	40
21	15	9.442644	10.557356	9.459993	10.540007	10.017349	9.982651	45	39
22	30	9.442754	10.557246	9.460112	10.539888	10.017358	9.982642	30	38
23	45	9.442863	10.557137	9.460231	10.539769	10.017367	9.982633	15	37
24	6	9.442973	10.557027	9.460349	10.539651	10.017376	9.982624	54	36
25	15	9.443082	10.556918	9.460468	10.539532	10.017386	9.982614	45	35
26	30	9.443192	10.556808	9.460586	10.539414	10.017395	9.982605	30	34
27	45	9.443301	10.556699	9.460705	10.539295	10.017404	9.982596	15	33
28	7	9.443410	10.556590	9.460823	10.539177	10.017413	9.982587	53	32
29	15	9.443520	10.556480	9.460942	10.539058	10.017422	9.982578	45	31
30	30	9.443629	10.556371	9.461060	10.538940	10.017431	9.982569	30	30
31	45	9.443738	10.556262	9.461178	10.538822	10.017440	9.982560	15	29
32	8	9.443847	10.556153	9.461297	10.538703	10.017449	9.982551	52	28
33	15	9.443956	10.556044	9.461415	10.538585	10.017459	9.982541	45	27
34	30	9.444065	10.555935	9.461533	10.538467	10.017468	9.982532	30	26
35	45	9.444175	10.555825	9.461651	10.538349	10.017477	9.982523	15	25
36	9	9.444284	10.555716	9.461770	10.538230	10.017486	9.982514	51	24
37	15	9.444393	10.555607	9.461888	10.538112	10.017495	9.982505	45	23
38	30	9.444502	10.555498	9.462006	10.537994	10.017504	9.982496	30	22
39	45	9.444611	10.555389	9.462124	10.537876	10.017513	9.982487	15	21
40	10	9.444720	10.555280	9.462242	10.537758	10.017523	9.982477	50	20
41	15	9.444829	10.555171	9.462360	10.537640	10.017532	9.982468	45	19
42	30	9.444938	10.555062	9.462478	10.537522	10.017541	9.982459	30	18
43	45	9.445046	10.554954	9.462596	10.537404	10.017550	9.982450	15	17
44	11	9.445155	10.554845	9.462714	10.537286	10.017559	9.982441	49	16
45	15	9.445264	10.554736	9.462832	10.537168	10.017568	9.982432	45	15
46	30	9.445373	10.554627	9.462950	10.537050	10.017578	9.982422	30	14
47	45	9.445482	10.554518	9.463068	10.536932	10.017587	9.982413	15	13
48	12	9.445590	10.554410	9.463186	10.536814	10.017596	9.982404	48	12
49	15	9.445699	10.554301	9.463304	10.536696	10.017605	9.982395	45	11
50	30	9.445808	10.554192	9.463422	10.536578	10.017614	9.982386	30	10
51	45	9.445916	10.554084	9.463540	10.536460	10.017624	9.982376	15	9
52	13	9.446025	10.553975	9.463658	10.536342	10.017633	9.982367	47	8
53	15	9.446133	10.553867	9.463775	10.536225	10.017642	9.982358	45	7
54	30	9.446242	10.553758	9.463893	10.536107	10.017651	9.982349	30	6
55	45	9.446351	10.553649	9.464011	10.535989	10.017660	9.982340	15	5
56	14	9.446459	10.553541	9.464128	10.535872	10.017669	9.982331	46	4
57	15	9.446567	10.553433	9.464246	10.535754	10.017679	9.982321	45	3
58	30	9.446676	10.553324	9.464364	10.535636	10.017688	9.982312	30	2
59	45	9.446784	10.553216	9.464481	10.535519	10.017697	9.982303	15	1
60	15	9.446893	10.553107	9.464599	10.535401	10.017706	9.982294	45	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	4h 55m.		LOG. SINES, &c.					73 deg.	

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	1h 5m.		LOG. SINES, &c.				16 deg.		
0	15	9.446893	10.553107	9.464599	10.535401	10.017706	9.982294	45	60
1	15	9.447001	10.552999	9.464716	10.535284	10.017715	9.982285	45	59
2	30	9.447109	10.552891	9.464834	10.535166	10.017725	9.982275	30	58
3	45	9.447218	10.552782	9.464951	10.535049	10.017734	9.982266	15	57
4	16	9.447326	10.552674	9.465069	10.534931	10.017743	9.982257	44	56
5	15	9.447434	10.552566	9.465186	10.534814	10.017752	9.982248	45	55
6	30	9.447542	10.552458	9.465304	10.534696	10.017762	9.982238	30	54
7	45	9.447650	10.552350	9.465421	10.534579	10.017771	9.982229	15	53
8	17	9.447759	10.552241	9.465539	10.534461	10.017780	9.982220	43	52
9	15	9.447867	10.552133	9.465656	10.534344	10.017789	9.982211	45	51
10	30	9.447975	10.552025	9.465773	10.534227	10.017798	9.982202	30	50
11	45	9.448083	10.551917	9.465890	10.534110	10.017808	9.982192	15	49
12	18	9.448191	10.551809	9.466008	10.533992	10.017817	9.982183	42	48
13	15	9.448299	10.551701	9.466125	10.533875	10.017826	9.982174	45	47
14	30	9.448407	10.551593	9.466242	10.533758	10.017835	9.982165	30	46
15	45	9.448515	10.551485	9.466359	10.533641	10.017845	9.982155	15	45
16	19	9.448623	10.551377	9.466476	10.533524	10.017854	9.982146	41	44
17	15	9.448731	10.551269	9.466594	10.533406	10.017863	9.982137	45	43
18	30	9.448838	10.551162	9.466711	10.533289	10.017872	9.982128	30	42
19	45	9.448946	10.551054	9.466828	10.533172	10.017882	9.982118	15	41
20	20	9.449054	10.550946	9.466945	10.533055	10.017891	9.982109	40	40
21	15	9.449162	10.550838	9.467062	10.532938	10.017900	9.982100	45	39
22	30	9.449269	10.550731	9.467179	10.532821	10.017909	9.982091	30	38
23	45	9.449377	10.550623	9.467296	10.532704	10.017919	9.982081	15	37
24	21	9.449485	10.550515	9.467413	10.532587	10.017928	9.982072	39	36
25	15	9.449592	10.550408	9.467530	10.532470	10.017937	9.982063	45	35
26	30	9.449700	10.550300	9.467646	10.532354	10.017946	9.982054	30	34
27	45	9.449808	10.550192	9.467763	10.532237	10.017956	9.982044	15	33
28	22	9.449915	10.550085	9.467880	10.532120	10.017965	9.982035	38	32
29	15	9.450023	10.549977	9.467997	10.532003	10.017974	9.982026	45	31
30	30	9.450130	10.549870	9.468114	10.531886	10.017984	9.982016	30	30
31	45	9.450238	10.549762	9.468230	10.531770	10.017993	9.982007	15	29
32	23	9.450345	10.549655	9.468347	10.531653	10.018002	9.981998	37	28
33	15	9.450453	10.549547	9.468464	10.531536	10.018011	9.981989	45	27
34	30	9.450560	10.549440	9.468581	10.531419	10.018021	9.981979	30	26
35	45	9.450667	10.549333	9.468697	10.531303	10.018030	9.981970	15	25
36	24	9.450775	10.549225	9.468814	10.531186	10.018039	9.981961	36	24
37	15	9.450882	10.549118	9.468930	10.531070	10.018049	9.981951	45	23
38	30	9.450989	10.549011	9.469047	10.530953	10.018058	9.981942	30	22
39	45	9.451096	10.548904	9.469164	10.530836	10.018067	9.981933	15	21
40	25	9.451204	10.548796	9.469280	10.530720	10.018076	9.981924	35	20
41	15	9.451311	10.548689	9.469397	10.530603	10.018086	9.981914	45	19
42	30	9.451418	10.548582	9.469513	10.530487	10.018095	9.981905	30	18
43	45	9.451525	10.548475	9.469629	10.530371	10.018104	9.981896	15	17
44	26	9.451632	10.548368	9.469746	10.530254	10.018114	9.981886	34	16
45	15	9.451739	10.548261	9.469862	10.530138	10.018123	9.981877	45	15
46	30	9.451846	10.548154	9.469979	10.530021	10.018132	9.981868	30	14
47	45	9.451953	10.548047	9.470095	10.529905	10.018142	9.981858	15	13
48	27	9.452060	10.547940	9.470211	10.529789	10.018151	9.981849	33	12
49	15	9.452167	10.547833	9.470327	10.529673	10.018160	9.981840	45	11
50	30	9.452274	10.547726	9.470444	10.529556	10.018170	9.981830	30	10
51	45	9.452381	10.547619	9.470560	10.529440	10.018179	9.981821	15	9
52	28	9.452488	10.547512	9.470676	10.529324	10.018188	9.981812	32	8
53	15	9.452595	10.547405	9.470792	10.529208	10.018198	9.981802	45	7
54	30	9.452702	10.547298	9.470908	10.529092	10.018207	9.981793	30	6
55	45	9.452808	10.547192	9.471025	10.528975	10.018216	9.981784	15	5
56	29	9.452915	10.547085	9.471141	10.528859	10.018226	9.981774	31	4
57	15	9.453022	10.546978	9.471257	10.528743	10.018235	9.981765	45	3
58	30	9.453128	10.546872	9.471373	10.528627	10.018244	9.981756	30	2
59	45	9.453235	10.546765	9.471489	10.528511	10.018254	9.981746	15	1
60	30	9.453342	10.546658	9.471605	10.528395	10.018263	9.981737	30	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	4h 54m.		LOG. SINES, &c.				73 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	$1^h\ 6^m$.		LOG. SINES, &c.				16 deg.		
0	30	9.453342	10.546658	9.471605	10.528395	10.018263	9.981737	30	60
1	15	9.453448	10.546552	9.471721	10.528279	10.018272	9.981728	45	59
2	30	9.453555	10.546445	9.471837	10.528163	10.018282	9.981718	30	58
3	45	9.453661	10.546339	9.471953	10.528047	10.018291	9.981709	15	57
4	31	9.453768	10.546232	9.472068	10.527932	10.018301	9.981699	29	56
5	15	9.453875	10.546125	9.472184	10.527816	10.018310	9.981690	45	55
6	30	9.453981	10.546019	9.472300	10.527700	10.018319	9.981681	30	54
7	45	9.454087	10.545913	9.472416	10.527584	10.018329	9.981671	15	53
8	32	9.454194	10.545806	9.472532	10.527468	10.018338	9.981662	28	52
9	15	9.454300	10.545700	9.472648	10.527352	10.018347	9.981653	45	51
10	30	9.454407	10.545593	9.472763	10.527237	10.018357	9.981643	30	50
11	45	9.454513	10.545487	9.472879	10.527121	10.018366	9.981634	15	49
12	33	9.454619	10.545381	9.472995	10.527005	10.018376	9.981624	27	48
13	15	9.454725	10.545275	9.473110	10.526890	10.018385	9.981615	45	47
14	30	9.454832	10.545168	9.473226	10.526774	10.018394	9.981606	30	46
15	45	9.454938	10.545062	9.473342	10.526658	10.018404	9.981596	15	45
16	34	9.455044	10.544956	9.473457	10.526543	10.018413	9.981587	26	44
17	15	9.455150	10.544850	9.473573	10.526427	10.018422	9.981578	45	43
18	30	9.455256	10.544744	9.473688	10.526312	10.018432	9.981568	30	42
19	45	9.455362	10.544638	9.473804	10.526196	10.018441	9.981559	15	41
20	35	9.455469	10.544531	9.473919	10.526081	10.018451	9.981549	25	40
21	15	9.455575	10.544425	9.474035	10.525965	10.018460	9.981540	45	39
22	30	9.455681	10.544319	9.474150	10.525850	10.018470	9.981530	30	38
23	45	9.455787	10.544213	9.474265	10.525735	10.018479	9.981521	15	37
24	36	9.455893	10.544107	9.474381	10.525619	10.018488	9.981512	24	36
25	15	9.455998	10.544002	9.474496	10.525504	10.018498	9.981502	45	35
26	30	9.456104	10.543896	9.474611	10.525389	10.018507	9.981493	30	34
27	45	9.456210	10.543790	9.474727	10.525273	10.018517	9.981483	15	33
28	37	9.456316	10.543684	9.474842	10.525158	10.018526	9.981474	23	32
29	15	9.456422	10.543578	9.474957	10.525043	10.018535	9.981465	45	31
30	30	9.456528	10.543472	9.475072	10.524928	10.018545	9.981455	30	30
31	45	9.456633	10.543367	9.475188	10.524812	10.018554	9.981446	15	29
32	38	9.456739	10.543261	9.475303	10.524697	10.018564	9.981436	22	28
33	15	9.456845	10.543155	9.475418	10.524582	10.018573	9.981427	45	27
34	30	9.456951	10.543049	9.475533	10.524467	10.018583	9.981417	30	26
35	45	9.457056	10.542944	9.475648	10.524352	10.018592	9.981408	15	25
36	39	9.457162	10.542838	9.475763	10.524237	10.018601	9.981399	21	24
37	15	9.457267	10.542733	9.475878	10.524122	10.018611	9.981389	45	23
38	30	9.457373	10.542627	9.475993	10.524007	10.018620	9.981380	30	22
39	45	9.457478	10.542522	9.476108	10.523892	10.018630	9.981370	15	21
40	40	9.457584	10.542416	9.476223	10.523777	10.018639	9.981361	20	20
41	15	9.457689	10.542311	9.476338	10.523662	10.018649	9.981351	45	19
42	30	9.457795	10.542205	9.476453	10.523547	10.018658	9.981342	30	18
43	45	9.457900	10.542100	9.476568	10.523432	10.018668	9.981332	15	17
44	41	9.458006	10.541994	9.476683	10.523317	10.018677	9.981323	19	16
45	15	9.458111	10.541889	9.476798	10.523202	10.018687	9.981313	45	15
46	30	9.458216	10.541784	9.476912	10.523088	10.018696	9.981304	30	14
47	45	9.458322	10.541678	9.477027	10.522973	10.018706	9.981294	15	13
48	42	9.458427	10.541573	9.477142	10.522858	10.018715	9.981285	18	12
49	15	9.458532	10.541468	9.477257	10.522743	10.018724	9.981276	45	11
50	30	9.458638	10.541362	9.477371	10.522629	10.018734	9.981266	30	10
51	45	9.458743	10.541257	9.477486	10.522514	10.018743	9.981257	15	9
52	43	9.458848	10.541152	9.477601	10.522399	10.018753	9.981247	17	8
53	15	9.458953	10.541047	9.477715	10.522285	10.018762	9.981238	45	7
54	30	9.459058	10.540942	9.477830	10.522170	10.018772	9.981228	30	6
55	45	9.459163	10.540837	9.477945	10.522055	10.018781	9.981219	15	5
56	44	9.459268	10.540732	9.478059	10.521941	10.018791	9.981209	16	4
57	15	9.459373	10.540627	9.478174	10.521826	10.018800	9.981200	45	3
58	30	9.459478	10.540522	9.478288	10.521712	10.018810	9.981190	30	2
59	45	9.459583	10.540417	9.478403	10.521597	10.018819	9.981181	15	1
60	45′	9.459688	10.540312	9.478517	10.521483	10.018829	9.981171	15	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$4^h\ 53^m$.		LOG. SINES, &c.				73 deg.		

sec.	1h 7m. ′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	45	9.459688	10.540312	9.478517	10.521483	10.018829	9.981171	15	60
1	15	9.459793	10.540207	9.478632	10.521368	10.018838	9.981162	45	59
2	30	9.459898	10.540102	9.478746	10.521254	10.018848	9.981152	30	58
3	45	9.460003	10.539997	9.478860	10.521140	10.018857	9.981143	15	57
4	46	9.460108	10.539892	9.478975	10.521025	10.018867	9.981133	14	56
5	15	9.460213	10.539787	9.479089	10.520911	10.018876	9.981124	45	55
6	30	9.460317	10.539683	9.479203	10.520797	10.018886	9.981114	30	54
7	45	9.460422	10.539578	9.479318	10.520682	10.018896	9.981104	15	53
8	47	9.460527	10.539473	9.479432	10.520568	10.018905	9.981095	13	52
9	15	9.460632	10.539368	9.479546	10.520454	10.018915	9.981085	45	51
10	30	9.460736	10.539264	9.479660	10.520340	10.018924	9.981076	30	50
11	45	9.460841	10.539159	9.479775	10.520225	10.018934	9.981066	15	49
12	48	9.460946	10.539054	9.479889	10.520111	10.018943	9.981057	12	48
13	15	9.461050	10.538950	9.480003	10.519997	10.018953	9.981047	45	47
14	30	9.461155	10.538845	9.480117	10.519883	10.018962	9.981038	30	46
15	45	9.461259	10.538741	9.480231	10.519769	10.018972	9.981028	15	45
16	49	9.461364	10.538636	9.480345	10.519655	10.018981	9.981019	11	44
17	15	9.461468	10.538532	9.480459	10.519541	10.018991	9.981009	45	43
18	30	9.461573	10.538427	9.480573	10.519427	10.019000	9.981000	30	42
19	45	9.461677	10.538323	9.480687	10.519313	10.019010	9.980990	15	41
20	50	9.461782	10.538218	9.480801	10.519199	10.019020	9.980980	10	40
21	15	9.461886	10.538114	9.480915	10.519085	10.019029	9.980971	45	39
22	30	9.461990	10.538010	9.481029	10.518971	10.019039	9.980961	30	38
23	45	9.462095	10.537905	9.481143	10.518857	10.019048	9.980952	15	37
24	51	9.462199	10.537801	9.481257	10.518743	10.019058	9.980942	9	36
25	15	9.462303	10.537697	9.481370	10.518630	10.019067	9.980933	45	35
26	30	9.462407	10.537593	9.481484	10.518516	10.019077	9.980923	30	34
27	45	9.462512	10.537488	9.481598	10.518402	10.019086	9.980914	15	33
28	52	9.462616	10.537384	9.481712	10.518288	10.019096	9.980904	8	32
29	15	9.462720	10.537280	9.481825	10.518175	10.019106	9.980894	45	31
30	30	9.462824	10.537176	9.481939	10.518061	10.019115	9.980885	30	30
31	45	9.462928	10.537072	9.482053	10.517947	10.019125	9.980875	15	29
32	53	9.463032	10.536968	9.482167	10.517833	10.019134	9.980866	7	28
33	15	9.463136	10.536864	9.482280	10.517720	10.019144	9.980856	45	27
34	30	9.463240	10.536760	9.482394	10.517606	10.019154	9.980846	30	26
35	45	9.463344	10.536656	9.482507	10.517493	10.019163	9.980837	15	25
36	54	9.463448	10.536552	9.482621	10.517379	10.019173	9.980827	6	24
37	15	9.463552	10.536448	9.482734	10.517266	10.019182	9.980818	45	23
38	30	9.463656	10.536344	9.482848	10.517152	10.019192	9.980808	30	22
39	45	9.463760	10.536240	9.482961	10.517039	10.019202	9.980798	15	21
40	55	9.463864	10.536136	9.483075	10.516925	10.019211	9.980789	5	20
41	15	9.463968	10.536032	9.483188	10.516812	10.019221	9.980779	45	19
42	30	9.464071	10.535929	9.483302	10.516698	10.019230	9.980770	30	18
43	45	9.464175	10.535825	9.483415	10.516585	10.019240	9.980760	15	17
44	56	9.464279	10.535721	9.483529	10.516471	10.019250	9.980750	4	16
45	15	9.464383	10.535617	9.483642	10.516358	10.019259	9.980741	45	15
46	30	9.464486	10.535514	9.483755	10.516245	10.019269	9.980731	30	14
47	45	9.464590	10.535410	9.483868	10.516132	10.019278	9.980722	15	13
48	57	9.464694	10.535306	9.483982	10.516018	10.019288	9.980712	3	12
49	15	9.464797	10.535203	9.484095	10.515905	10.019298	9.980702	45	11
50	30	9.464901	10.535099	9.484208	10.515792	10.019307	9.980693	30	10
51	45	9.465004	10.534996	9.484321	10.515679	10.019317	9.980683	15	9
52	58	9.465108	10.534892	9.484435	10.515565	10.019327	9.980673	2	8
53	15	9.465212	10.534788	9.484548	10.515452	10.019336	9.980664	45	7
54	30	9.465315	10.534685	9.484661	10.515339	10.019346	9.980654	30	6
55	45	9.465418	10.534582	9.484774	10.515226	10.019355	9.980645	15	5
56	59	9.465522	10.534478	9.484887	10.515113	10.019365	9.980635	1	4
57	15	9.465625	10.534375	9.485000	10.515000	10.019375	9.980625	45	3
58	30	9.465729	10.534271	9.485113	10.514887	10.019384	9.980616	30	2
59	45	9.465832	10.534168	9.485226	10.514774	10.019394	9.980606	15	1
60	60	9.465935	10.534065	9.485339	10.514661	10.019404	9.980596	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.

1h 8m.				LOG. SINES, &c.			17 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	0	9.465935	10.534065	9.485339	10.514661	10.019404	9.980596	60	60
1	15	9.466039	10.533961	9.485452	10.514548	10.019413	9.980587	45	59
2	30	9.466142	10.533858	9.485565	10.514435	10.019423	9.980577	30	58
3	45	9.466245	10.533755	9.485678	10.514322	10.019433	9.980567	15	57
4	1	9.466348	10.533652	9.485791	10.514209	10.019442	9.980558	59	56
5	15	9.466451	10.533549	9.485903	10.514097	10.019452	9.980548	45	55
6	30	9.466555	10.533445	9.486016	10.513984	10.019462	9.980538	30	54
7	45	9.466658	10.533342	9.486129	10.513871	10.019471	9.980529	15	53
8	2	9.466761	10.533239	9.486242	10.513758	10.019481	9.980519	58	52
9	15	9.466864	10.533136	9.486355	10.513645	10.019491	9.980509	45	51
10	30	9.466967	10.533033	9.486467	10.513533	10.019500	9.980500	30	50
11	45	9.467070	10.532930	9.486580	10.513420	10.019510	9.980490	15	49
12	3	9.467173	10.532827	9.486693	10.513307	10.019520	9.980480	57	48
13	15	9.467276	10.532724	9.486805	10.513195	10.019529	9.980471	45	47
14	30	9.467379	10.532621	9.486918	10.513082	10.019539	9.980461	30	46
15	45	9.467482	10.532518	9.487031	10.512969	10.019549	9.980451	15	45
16	4	9.467585	10.532415	9.487143	10.512857	10.019559	9.980441	56	44
17	15	9.467688	10.532312	9.487256	10.512744	10.019568	9.980432	45	43
18	30	9.467790	10.532210	9.487368	10.512632	10.019578	9.980422	30	42
19	45	9.467893	10.532107	9.487481	10.512519	10.019588	9.980412	15	41
20	5	9.467996	10.532004	9.487593	10.512407	10.019597	9.980403	55	40
21	15	9.468099	10.531901	9.487706	10.512294	10.019607	9.980393	45	39
22	30	9.468201	10.531799	9.487818	10.512182	10.019617	9.980383	30	38
23	45	9.468304	10.531696	9.487931	10.512069	10.019626	9.980374	15	37
24	6	9.468407	10.531593	9.488043	10.511957	10.019636	9.980364	54	36
25	15	9.468509	10.531491	9.488155	10.511845	10.019646	9.980354	45	35
26	30	9.468612	10.531388	9.488268	10.511732	10.019656	9.980344	30	34
27	45	9.468715	10.531285	9.488380	10.511620	10.019665	9.980335	15	33
28	7	9.468817	10.531183	9.488492	10.511508	10.019675	9.980325	53	32
29	15	9.468920	10.531080	9.488605	10.511395	10.019685	9.980315	45	31
30	30	9.469022	10.530978	9.488717	10.511283	10.019695	9.980305	30	30
31	45	9.469125	10.530875	9.488829	10.511171	10.019704	9.980296	15	29
32	8	9.469227	10.530773	9.488941	10.511059	10.019714	9.980286	52	28
33	15	9.469330	10.530670	9.489053	10.510947	10.019724	9.980276	45	27
34	30	9.469432	10.530568	9.489166	10.510834	10.019733	9.980267	30	26
35	45	9.469535	10.530465	9.489278	10.510722	10.019743	9.980257	15	25
36	9	9.469637	10.530363	9.489390	10.510610	10.019753	9.980247	51	24
37	15	9.469739	10.530261	9.489502	10.510498	10.019763	9.980237	45	23
38	30	9.469842	10.530158	9.489614	10.510386	10.019772	9.980228	30	22
39	45	9.469944	10.530056	9.489726	10.510274	10.019782	9.980218	15	21
40	10	9.470046	10.529954	9.489838	10.510162	10.019792	9.980208	50	20
41	15	9.470148	10.529852	9.489950	10.510050	10.019802	9.980198	45	19
42	30	9.470250	10.529750	9.490062	10.509938	10.019811	9.980189	30	18
43	45	9.470353	10.529647	9.490174	10.509826	10.019821	9.980179	15	17
44	11	9.470455	10.529545	9.490286	10.509714	10.019831	9.980169	49	16
45	15	9.470557	10.529443	9.490398	10.509602	10.019841	9.980159	45	15
46	30	9.470659	10.529341	9.490510	10.509490	10.019851	9.980149	30	14
47	45	9.470761	10.529239	9.490621	10.509379	10.019860	9.980140	15	13
48	12	9.470863	10.529137	9.490733	10.509267	10.019870	9.980130	48	12
49	15	9.470965	10.529035	9.490845	10.509155	10.019880	9.980120	45	11
50	30	9.471067	10.528933	9.490957	10.509043	10.019890	9.980110	30	10
51	45	9.471169	10.528831	9.491068	10.508932	10.019899	9.980101	15	9
52	13	9.471271	10.528729	9.491180	10.508820	10.019909	9.980091	47	8
53	15	9.471373	10.528627	9.491292	10.508708	10.019919	9.980081	45	7
54	30	9.471475	10.528525	9.491404	10.508596	10.019929	9.980071	30	6
55	45	9.471577	10.528423	9.491515	10.508485	10.019939	9.980061	15	5
56	14	9.471678	10.528322	9.491627	10.508373	10.019948	9.980052	46	4
57	15	9.471780	10.528220	9.491738	10.508262	10.019958	9.980042	45	3
58	30	9.471882	10.528118	9.491850	10.508150	10.019968	9.980032	30	2
59	45	9.471984	10.528016	9.491962	10.508038	10.019978	9.980022	15	1
60	15	9.472086	10.527914	9.492073	10.507927	10.019988	9.980012	45	0
sec	′ ″	cosine.	secant.	cotangent	tangent.	cosecant.	sine.	″ ′	sec.
4h 51m.				LOG. SINES, &c			72 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	1h 9m.		LOG. SINES, &C.				17 deg.		
0	15	9.472086	10.527914	9.492073	10.507927	10.019988	9.980012	45	60
1	15	9.472187	10.527813	9.492185	10.507815	10.019997	9.980003	45	59
2	30	9.472289	10.527711	9.492296	10.507704	10.020007	9.979993	30	58
3	45	9.472391	10.527609	9.492408	10.507592	10.020017	9.979983	15	57
4	16	9.472492	10.527508	9.492519	10.507481	10.020027	9.979973	44	56
5	15	9.472594	10.527406	9.492630	10.507370	10.020037	9.979963	45	55
6	30	9.472695	10.527305	9.492742	10.507258	10.020046	9.979954	30	54
7	45	9.472797	10.527203	9.492853	10.507147	10.020056	9.979944	15	53
8	17	9.472898	10.527102	9.492965	10.507035	10.020066	9.979934	43	52
9	15	9.473000	10.527000	9.493076	10.506924	10.020076	9.979924	45	51
10	30	9.473101	10.526899	9.493187	10.506813	10.020086	9.979914	30	50
11	45	9.473203	10.526797	9.493298	10.506702	10.020096	9.979904	15	49
12	18	9.473304	10.526696	9.493410	10.506590	10.020105	9.979895	42	48
13	15	9.473406	10.526594	9.493521	10.506479	10.020115	9.979885	45	47
14	30	9.473507	10.526493	9.493632	10.506368	10.020125	9.979875	30	46
15	45	9.473608	10.526392	9.493743	10.506257	10.020135	9.979865	15	45
16	19	9.473710	10.526290	9.493854	10.506146	10.020145	9.979855	41	44
17	15	9.473811	10.526189	9.493966	10.506034	10.020155	9.979845	45	43
18	30	9.473912	10.526088	9.494077	10.505923	10.020165	9.979835	30	42
19	45	9.474013	10.525987	9.494188	10.505812	10.020174	9.979826	15	41
20	20	9.474115	10.525885	9.494299	10.505701	10.020184	9.979816	40	40
21	15	9.474216	10.525784	9.494410	10.505590	10.020194	9.979806	45	39
22	30	9.474317	10.525683	9.494521	10.505479	10.020204	9.979796	30	38
23	45	9.474418	10.525582	9.494632	10.505368	10.020214	9.979786	15	37
24	21	9.474519	10.525481	9.494743	10.505257	10.020224	9.979776	39	36
25	15	9.474620	10.525380	9.494854	10.505146	10.020234	9.979766	45	35
26	30	9.474721	10.525279	9.494965	10.505035	10.020243	9.979757	30	34
27	45	9.474822	10.525178	9.495076	10.504924	10.020253	9.979747	15	33
28	22	9.474923	10.525077	9.495186	10.504814	10.020263	9.979737	38	32
29	15	9.475024	10.524976	9.495297	10.504703	10.020273	9.979727	45	31
30	30	9.475125	10.524875	9.495408	10.504592	10.020283	9.979717	30	30
31	45	9.475226	10.524774	9.495519	10.504481	10.020293	9.979707	15	29
32	23	9.475327	10.524673	9.495630	10.504370	10.020303	9.979697	37	28
33	15	9.475428	10.524572	9.495740	10.504260	10.020313	9.979687	45	27
34	30	9.475529	10.524471	9.495851	10.504149	10.020322	9.979678	30	26
35	45	9.475630	10.524370	9.495962	10.504038	10.020332	9.979668	15	25
36	24	9.475730	10.524270	9.496073	10.503927	10.020342	9.979658	36	24
37	15	9.475831	10.524169	9.496183	10.503817	10.020352	9.979648	45	23
38	30	9.475932	10.524068	9.496294	10.503706	10.020362	9.979638	30	22
39	45	9.476033	10.523967	9.496405	10.503595	10.020372	9.979628	15	21
40	25	9.476133	10.523867	9.496515	10.503485	10.020382	9.979618	35	20
41	15	9.476234	10.523766	9.496626	10.503374	10.020392	9.979608	45	19
42	30	9.476335	10.523665	9.496736	10.503264	10.020402	9.979598	30	18
43	45	9.476435	10.523565	9.496847	10.503153	10.020412	9.979588	15	17
44	26	9.476536	10.523464	9.496957	10.503043	10.020422	9.979578	34	16
45	15	9.476636	10.523364	9.497068	10.502932	10.020431	9.979569	45	15
46	30	9.476737	10.523263	9.497178	10.502822	10.020441	9.979559	30	14
47	45	9.476837	10.523163	9.497289	10.502711	10.020451	9.979549	15	13
48	27	9.476938	10.523062	9.497399	10.502601	10.020461	9.979539	33	12
49	15	9.477038	10.522962	9.497509	10.502491	10.020471	9.979529	45	11
50	30	9.477139	10.522861	9.497620	10.502380	10.020481	9.979519	30	10
51	45	9.477239	10.522761	9.497730	10.502270	10.020491	9.979509	15	9
52	28	9.477340	10.522660	9.497841	10.502159	10.020501	9.979499	32	8
53	15	9.477440	10.522560	9.497951	10.502049	10.020511	9.979489	45	7
54	30	9.477540	10.522460	9.498061	10.501939	10.020521	9.979479	30	6
55	45	9.477641	10.522359	9.498171	10.501829	10.020531	9.979469	15	5
56	29	9.477741	10.522259	9.498282	10.501718	10.020541	9.979459	31	4
57	15	9.477841	10.522159	9.498392	10.501608	10.020551	9.979449	45	3
58	30	9.477941	10.522059	9.498502	10.501498	10.020561	9.979439	30	2
59	45	9.478042	10.521958	9.498612	10.501388	10.020571	9.979429	15	1
60	30	9.478142	10.521858	9.498722	10.501278	10.020581	9.979419	30	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	4h 50m.		LOG. SINES, &c.				72 deg.		

1h 10m.		LOG. SINES, &c.					17 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	30	9.478142	10.521858	9.498722	10.501278	10.020581	9.979419	30	60
1	15	9.478242	10.521758	9.498832	10.501168	10.020591	9.979409	45	59
2	30	9.478342	10.521658	9.498942	10.501058	10.020600	9.979400	30	58
3	45	9.478442	10.521558	9.499053	10.500947	10.020610	9.979390	15	57
4	31	9.478542	10.521458	9.499163	10.500837	10.020620	9.979380	29	56
5	15	9.478642	10.521358	9.499273	10.500727	10.020630	9.979370	45	55
6	30	9.478742	10.521258	9.499383	10.500617	10 020640	9.979360	30	54
7	45	9.478842	10.521158	9.499493	10.500507	10.020650	9.979350	15	53
8	32	9.478942	10.521058	9.499603	10.500397	10.020660	9.979340	28	52
9	15	9.479042	10.520958	9.499712	10.500288	10.020670	9.979330	45	51
10	30	9.479142	10.520858	9.499822	10.500178	10.020680	9.979320	30	50
11	45	9.479242	10.520758	9.499932	10.500068	10.020690	9.979310	15	49
12	33	9.479342	10.520658	9.500042	10.499958	10.020700	9.979300	27	48
13	15	9.479442	10.520558	9.500152	10.499848	10.020710	9.979290	45	47
14	30	9.479542	10.520458	9.500262	10.499738	10.020720	9.979280	30	46
15	45	9.479642	10.520358	9.500372	10.499628	10.020730	9.979270	15	45
16	34	9.479741	10.520259	9.500481	10.499519	10.020740	9.979260	26	44
17	15	9.479841	10.520159	9.500591	10.499409	10.020750	9.979250	45	43
18	30	9.479941	10.520059	9.500701	10.499299	10.020760	9.979240	30	42
19	45	9.480040	10.519960	9.500811	10.499189	10.020770	9.979230	15	41
20	35	9.480140	10.519860	9.500920	10.499080	10.020780	9.979220	25	40
21	15	9.480240	10.519760	9.501030	10.498970	10.020790	9.979210	45	39
22	30	9.480339	10.519661	9.501140	10.498860	10.020800	9.979200	30	38
23	45	9.480439	10.519561	9.501249	10.498751	10.020810	9.979190	15	37
24	36	9.480538	10.519462	9.501359	10.498641	10.020820	9.979180	24	36
25	15	9.480638	10.519362	9.501468	10.498532	10.020830	9.979170	45	35
26	30	9.480738	10.519262	9.501578	10.498422	10.020840	9.979160	30	34
27	45	9.480837	10.519163	9.501687	10.498313	10.020850	9.979150	15	33
28	37	9.480937	10.519063	9.501797	10.498203	10.020860	9.979140	23	32
29	15	9.481036	10.518964	9.501906	10.498094	10.020870	9.979130	45	31
30	30	9.481135	10.518865	9.502016	10.497984	10.020880	9.979120	30	30
31	45	9.481235	10.518765	9.502125	10.497875	10.020890	9.979110	15	29
32	38	9.481334	10.518666	9.502235	10.497765	10.020900	9.979100	22	28
33	15	9.481434	10.518566	9.502344	10.497656	10.020911	9.979089	45	27
34	30	9.481533	10.518467	9.502453	10.497547	10.020921	9.979079	30	26
35	45	9.481632	10.518368	9.502563	10.497437	10.020931	9.979069	15	25
36	39	9.481731	10.518269	9.502672	10.497328	10.020941	9.979059	21	24
37	15	9.481831	10.518169	9.502781	10.497219	10.020951	9.979049	45	23
38	30	9.481930	10.518070	9.502891	10.497109	10.020961	9.979039	30	22
39	45	9.482029	10.517971	9.503000	10.497000	10.020971	9.979029	15	21
40	40	9.482128	10.517872	9.503109	10.496891	10.020981	9.979019	20	20
41	15	9.482227	10.517773	9.503218	10.496782	10.020991	9.979009	45	19
42	30	9.482327	10.517673	9.503328	10.496672	10.021001	9.978999	30	18
43	45	9.482426	10.517574	9.503437	10.496563	10.021011	9.978989	15	17
44	41	9.482525	10.517475	9.503546	10.496454	10.021021	9.978979	19	16
45	15	9.482624	10.517376	9.503655	10.496345	10.021031	9.978969	45	15
46	30	9.482723	10.517277	9.503764	10.496236	10.021041	9.978959	30	14
47	45	9.482822	10.517178	9.503873	10.496127	10.021051	9.978949	15	13
48	42	9.482921	10.517079	9.503982	10.496018	10.021061	9.978939	18	12
49	15	9.483020	10.516980	9.504091	10.495909	10.021072	9.978928	45	11
50	30	9.483119	10.516881	9.504200	10.495800	10.021082	9.978918	30	10
51	45	9.483218	10.516782	9.504309	10.495691	10.021092	9.978908	15	9
52	43	9.483316	10.516684	9.504418	10.495582	10.021102	9.978898	17	8
53	15	9.483415	10.516585	9.504527	10.495473	10.021112	9.978888	45	7
54	30	9.483514	10.516486	9.504636	10.495364	10.021122	9.978878	30	6
55	45	9.483613	10.516387	9.504745	10.495255	10.021132	9.978868	15	5
56	44	9.483712	10.516288	9.504854	10.495146	10.021142	9.978858	16	4
57	15	9.483810	10.516190	9.504963	10.495037	10.021152	9.978848	45	3
58	30	9.483909	10.516091	9.505071	10.494929	10.021162	9.978838	30	2
59	45	9.484008	10.515992	9.505180	10.494820	10.021172	9.978828	15	1
60	45	9.484107	10.515893	9.505289	10.494711	10.021183	9.978817	15	0
sec	′ ″	cosine	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
4h 49m.			LOG. SINES, &c.				72 deg.		

1h 11m.			LOG. SINES, &c.				17 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	45	9.484107	10.515893	9.505289	10.494711	10.021183	9.978817	15	60
1	15	9.484205	10.515795	9.505398	10.494602	10.021193	9.978807	45	59
2	30	9.484304	10.515696	9.505507	10.494493	10.021203	9.978797	30	58
3	45	9.484402	10.515598	9.505615	10.494385	10.021213	9.978787	15	57
4	46	9.484501	10.515499	9.505724	10.494276	10.021223	9.978777	14	56
5	15	9.484600	10.515400	9.505833	10.494167	10.021233	9.978767	45	55
6	30	9.484698	10.515302	9.505941	10.494059	10.021243	9.978757	30	54
7	45	9.484797	10.515203	9.506050	10.493950	10.021253	9.978747	15	53
8	47	9.484895	10.515105	9.506159	10.493841	10.021264	9.978736	13	52
9	15	9.484994	10.515006	9.506267	10.493733	10.021274	9.978726	45	51
10	30	9.485092	10.514908	9.506376	10.493624	10.021284	9.978716	30	50
11	45	9.485190	10.514810	9.506484	10.493516	10.021294	9.978706	15	49
12	48	9.485289	10.514711	9.506593	10.493407	10.021304	9.978696	12	48
13	15	9.485387	10.514613	9.506701	10.493299	10.021314	9.978686	45	47
14	30	9.485485	10.514515	9.506810	10.493190	10.021324	9.978676	30	46
15	45	9.485584	10.514416	9.506918	10.493082	10.021335	9.978665	15	45
16	49	9.485682	10.514318	9.507027	10.492973	10.021345	9.978655	11	44
17	15	9.485780	10.514220	9.507135	10.492865	10.021355	9.978645	45	43
18	30	9.485878	10.514122	9.507243	10.492757	10.021365	9.978635	30	42
19	45	9.485977	10.514023	9.507352	10.492648	10.021375	9.978625	15	41
20	50	9.486075	10.513925	9.507460	10.492540	10.021385	9.978615	10	40
21	15	9.486173	10.513827	9.507568	10.492432	10.021395	9.978605	45	39
22	30	9.486271	10.513729	9.507677	10.492323	10.021406	9.978594	30	38
23	45	9.486369	10.513631	9.507785	10.492215	10.021416	9.978584	15	37
24	51	9.486467	10.513533	9.507893	10.492107	10.021426	9.978574	9	36
25	15	9.486565	10.513435	9.508002	10.491998	10.021436	9.978564	45	35
26	30	9.486663	10.513337	9.508110	10.491890	10.021446	9.978554	30	34
27	45	9.486761	10.513239	9.508218	10.491782	10.021456	9.978544	15	33
28	52	9.486859	10.513141	9.508326	10.491674	10.021467	9.978533	8	32
29	15	9.486957	10.513043	9.508434	10.491566	10.021477	9.978523	45	31
30	30	9.487055	10.512945	9.508542	10.491458	10.021487	9.978513	30	30
31	45	9.487153	10.512847	9.508650	10.491350	10.021497	9.978503	15	29
32	53	9.487251	10.512749	9.508759	10.491241	10.021507	9.978493	7	28
33	15	9.487349	10.512651	9.508867	10.491133	10.021518	9.978482	45	27
34	30	9.487447	10.512553	9.508975	10.491025	10.021528	9.978472	30	26
35	45	9.487545	10.512455	9.509083	10.490917	10.021538	9.978462	15	25
36	54	9.487643	10.512357	9.509191	10.490809	10.021548	9.978452	6	24
37	15	9.487740	10.512260	9.509299	10.490701	10.021558	9.978442	45	23
38	30	9.487838	10.512162	9.509407	10.490593	10.021569	9.978431	30	22
39	45	9.487936	10.512064	9.509514	10.490486	10.021579	9.978421	15	21
40	55	9.488033	10.511967	9.509622	10.490378	10.021589	9.978411	5	20
41	15	9.488131	10.511869	9.509730	10.490270	10.021599	9.978401	45	19
42	30	9.488229	10.511771	9.509838	10.490162	10.021609	9.978391	30	18
43	45	9.488326	10.511674	9.509946	10.490054	10.021620	9.978380	15	17
44	56	9.488424	10.511576	9.510054	10.489946	10.021630	9.978370	4	16
45	15	9.488522	10.511478	9.510162	10.489838	10.021640	9.978360	45	15
46	30	9.488619	10.511381	9.510269	10.489731	10.021650	9.978350	30	14
47	45	9.488717	10.511283	9.510377	10.489623	10.021661	9.978339	15	13
48	57	9.488814	10.511186	9.510485	10.489515	10.021671	9.978329	3	12
49	15	9.488912	10.511088	9.510593	10.489407	10.021681	9.978319	45	11
50	30	9.489009	10.510991	9.510700	10.489300	10.021691	9.978309	30	10
51	45	9.489107	10.510893	9.510808	10.489192	10.021701	9.978299	15	9
52	58	9.489204	10.510796	9.510916	10.489084	10.021712	9.978288	2	8
53	15	9.489301	10.510699	9.511023	10.488977	10.021722	9.978278	45	7
54	30	9.489399	10.510601	9.511131	10.488869	10.021732	9.978268	30	6
55	45	9.489496	10.510504	9.511238	10.488762	10.021742	9.978258	15	5
56	59	9.489593	10.510407	9.511346	10.488654	10.021753	9.978247	1	4
57	15	9.489691	10.510309	9.511454	10.488546	10.021763	9.978237	45	3
58	30	9.489788	10.510212	9.511561	10.488439	10.021773	9.978227	30	2
59	45	9.489885	10.510115	9.511669	10.488331	10.021783	9.978217	15	1
60	60	9.489982	10.510018	9.511776	10.488224	10.021794	9.978206	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
4h 48m.			LOG. SINES, &c.				72 deg.		

1h 12m.				LOG. SINES, &C.			18 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	0	9.489982	10.510018	9.511776	10.488224	10.021794	9.978206	60	60
1	15	9.490080	10.509920	9.511883	10.488117	10.021804	9.978196	45	59
2	30	9.490177	10.509823	9.511991	10.488009	10.021814	9.978186	30	58
3	45	9.490274	10.509726	9.512098	10.487902	10.021825	9.978175	15	57
4	1	9.490371	10.509629	9.512206	10.487794	10.021835	9.978165	59	56
5	15	9.490468	10.509532	9.512313	10.487687	10.021845	9.978155	45	55
6	30	9.490565	10.509435	9.512420	10.487580	10.021855	9.978145	30	54
7	45	9.490662	10.509338	9.512528	10.487472	10.021866	9.978134	15	53
8	2	9.490759	10.509241	9.512635	10.487365	10.021876	9.978124	58	52
9	15	9.490856	10.509144	9.512742	10.487258	10.021886	9.978114	45	51
10	30	9.490953	10.509047	9.512850	10.487150	10.021896	9.978104	30	50
11	45	9.491050	10.508950	9.512957	10.487043	10.021907	9.978093	15	49
12	3	9.491147	10.508853	9.513064	10.486936	10.021917	9.978083	57	48
13	15	9.491244	10.508756	9.513171	10.486829	10.021927	9.978073	45	47
14	30	9.491341	10.508659	9.513278	10.486722	10.021938	9.978062	30	46
15	45	9.491438	10.508562	9.513386	10.486614	10.021948	9.978052	15	45
16	4	9.491534	10.508466	9.513493	10.486507	10.021958	9.978042	56	44
17	15	9.491631	10.508369	9.513600	10.486400	10.021969	9.978031	45	43
18	30	9.491728	10.508272	9.513707	10.486293	10.021979	9.978021	30	42
19	45	9.491825	10.508175	9.513814	10.486186	10.021989	9.978011	15	41
20	5	9.491922	10.508078	9.513921	10.486079	10.021999	9.978001	55	40
21	15	9.492018	10.507982	9.514028	10.485972	10.022010	9.977990	45	39
22	30	9.492115	10.507885	9.514135	10.485865	10.022020	9.977980	30	38
23	45	9.492212	10.507788	9.514242	10.485758	10.022030	9.977970	15	37
24	6	9.492308	10.507692	9.514349	10.485651	10.022041	9.977959	54	36
25	15	9.492405	10.507595	9.514456	10.485544	10.022051	9.977949	45	35
26	30	9.492501	10.507499	9.514563	10.485437	10.022061	9.977939	30	34
27	45	9.492598	10.507402	9.514670	10.485330	10.022072	9.977928	15	33
28	7	9.492695	10.507305	9.514777	10.485223	10.022082	9.977918	53	32
29	15	9.492791	10.507209	9.514883	10.485117	10.022092	9.977908	45	31
30	30	9.492888	10.507112	9.514990	10.485010	10.022103	9.977897	30	30
31	45	9.492984	10.507016	9.515097	10.484903	10.022113	9.977887	15	29
32	8	9.493081	10.506919	9.515204	10.484796	10.022123	9.977877	52	28
33	15	9.493177	10.506823	9.515311	10.484689	10.022134	9.977866	45	27
34	30	9.493273	10.506727	9.515417	10.484583	10.022144	9.977856	30	26
35	45	9.493370	10.506630	9.515524	10.484476	10.022154	9.977846	15	25
36	9	9.493466	10.506534	9.515631	10.484369	10.022165	9.977835	51	24
37	15	9.493562	10.506438	9.515738	10.484262	10.022175	9.977825	45	23
38	30	9.493659	10.506341	9.515844	10.484156	10.022186	9.977814	30	22
39	45	9.493755	10.506245	9.515951	10.484049	10.022196	9.977804	15	21
40	10	9.493851	10.506149	9.516057	10.483943	10.022206	9.977794	50	20
41	15	9.493947	10.506053	9.516164	10.483836	10.022217	9.977783	45	19
42	30	9.494044	10.505956	9.516271	10.483729	10.022227	9.977773	30	18
43	45	9.494140	10.505860	9.516377	10.483623	10.022237	9.977763	15	17
44	11	9.494236	10.505764	9.516484	10.483516	10.022248	9.977752	49	16
45	15	9.494332	10.505668	9.516590	10.483410	10.022258	9.977742	45	15
46	30	9.494428	10.505572	9.516697	10.483303	10.022268	9.977732	30	14
47	45	9.494524	10.505476	9.516803	10.483197	10.022279	9.977721	15	13
48	12	9.494620	10.505380	9.516910	10.483090	10.022289	9.977711	48	12
49	15	9.494717	10.505283	9.517016	10.482984	10.022300	9.977700	45	11
50	30	9.494813	10.505187	9.517123	10.482877	10.022310	9.977690	30	10
51	45	9.494909	10.505091	9.517229	10.482771	10.022320	9.977680	15	9
52	13	9.495005	10.504995	9.517335	10.482665	10.022331	9.977669	47	8
53	15	9.495100	10.504900	9.517442	10.482558	10.022341	9.977659	45	7
54	30	9.495196	10.504804	9.517548	10.482452	10.022352	9.977648	30	6
55	45	9.495292	10.504708	9.517654	10.482346	10.022362	9.977638	15	5
56	14	9.495388	10.504612	9.517761	10.482239	10.022372	9.977628	46	4
57	15	9.495484	10.504516	9.517867	10.482133	10.022383	9.977617	45	3
58	30	9.495580	10.504420	9.517973	10.482027	10.022393	9.977607	30	2
59	45	9.495676	10.504324	9.518079	10.481921	10.022404	9.977596	15	1
60	15	9.495772	10.504228	9.518185	10.481815	10.022414	9.977586	45	0
sec.	′ ″	cosine.	secant.	cotangent	tangent.	cosecant.	sine.	″ ′	sec.
4h 47m.				LOG. SINES, &C.			71 deg.		

1h 13m.				LOG. SINES, &c.			18 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	15	9.495772	10.504228	9.518185	10.481815	10.022414	9.977586	45	60
1	15	9.495867	10.504133	9.518292	10.481708	10.022424	9.977576	45	59
2	30	9.495963	10.504037	9.518398	10.481602	10.022435	9.977565	30	58
3	45	9.496059	10.503941	9.518504	10.481496	10.022445	9.977555	15	57
4	16	9.496154	10.503846	9.518610	10.481390	10.022456	9.977544	44	56
5	15	9.496250	10.503750	9.518716	10.481284	10 022466	9.977534	45	55
6	30	9.496346	10.503654	9.518822	10.481178	10.022477	9.977523	30	54
7	45	9.496441	10.503559	9.518928	10.481072	10.022487	9.977513	15	53
8	17	9.496537	10.503463	9.519034	10.480966	10.022497	9.977503	43	52
9	15	9.496633	10.503367	9.519140	10.480860	10.022508	9.977492	45	51
10	30	9.496728	10.503272	9.519246	10.480754	10.022518	9.977482	30	50
11	45	9.496824	10.503176	9.519352	10.480648	10.022529	9.977471	15	49
12	18	9.496919	10.503081	9.519458	10.480542	10.022539	9.977461	42	48
13	15	9.497015	10.502985	9.519564	10.480436	10.022550	9.977450	45	47
14	30	9.497110	10.502890	9.519670	10.480330	10.022560	9.977440	30	46
15	45	9.497206	10.502794	9.519776	10.480224	10.022571	9.977429	15	45
16	19	9.497301	10.502699	9.519882	10.480118	10.022581	9.977419	41	44
17	15	9.497396	10.502604	9.519988	10.480012	10.022591	9.977409	45	43
18	30	9.497492	10.502508	9.520094	10.479906	10.022602	9.977398	30	42
19	45	9.497587	10.502413	9.520199	10.479801	10.022612	9.977388	15	41
20	20	9.497682	10.502318	9.520305	10.479695	10.022623	9.977377	40	40
21	15	9.497778	10.502222	9.520411	10.479589	10.022633	9.977367	45	39
22	30	9.497873	10.502127	9.520517	10.479483	10.022644	9.977356	30	38
23	45	9.497968	10.502032	9.520622	10.479378	10.022654	9.977346	15	37
24	21	9.498063	10.501937	9.520728	10.479272	10.022665	9.977335	39	36
25	15	9.498159	10.501841	9.520834	10.479166	10.022675	9.977325	45	35
26	30	9.498254	10.501746	9.520939	10.479061	10.022686	9.977314	30	34
27	45	9.498349	10.501651	9.521045	10.478955	10.022696	9.977304	15	33
28	22	9.498444	10.501556	9.521151	10.478849	10.022707	9.977293	38	32
29	15	9.498539	10.501461	9.521256	10.478744	10.022717	9.977283	45	31
30	30	9.498634	10.501366	9.521362	10.478638	10.022728	9.977272	30	30
31	45	9.498729	10.501271	9.521467	10.478533	10.022738	9.977262	15	29
32	23	9.498824	10.501176	9.521573	10.478427	10.022749	9.977251	37	28
33	15	9.498919	10.501081	9.521679	10.478321	10.022759	9.977241	45	27
34	30	9.499014	10.500986	9.521784	10.478216	10.022770	9.977230	30	26
35	45	9.499109	10.500891	9.521889	10.478111	10.022780	9.977220	15	25
36	24	9.499204	10.500796	9.521995	10.478005	10.022791	9.977209	36	24
37	15	9.499299	10.500701	9.522100	10.477900	10.022801	9.977199	45	23
38	30	9.499394	10.500606	9.522206	10.477794	10.022812	9.977188	30	22
39	45	9.499489	10.500511	9.522311	10.477689	10.022822	9.977178	15	21
40	25	9.499584	10.500416	9.522417	10.477583	10.022833	9.977167	35	20
41	15	9.499679	10.500321	9.522522	10.477478	10.022843	9.977157	45	19
42	30	9.499774	10.500226	9.522627	10.477373	10.022854	9.977146	30	18
43	45	9.499868	10.500132	9.522733	10.477267	10.022864	9.977136	15	17
44	26	9.499963	10.500037	9.522838	10.477162	10.022875	9.977125	34	16
45	15	9.500058	10.499942	9.522943	10.477057	10.022885	9.977115	45	15
46	30	9.500153	10.499847	9.523048	10.476952	10.022896	9.977104	30	14
47	45	9.500247	10.499753	9.523154	10.476846	10.022906	9.977094	15	13
48	27	9.500342	10.499658	9.523259	10.476741	10.022917	9.977083	33	12
49	15	9.500437	10.499563	9.523364	10.476636	10.022927	9.977073	45	11
50	30	9.500531	10.499469	9.523469	10.476531	10.022938	9.977062	30	10
51	45	9.500626	10.499374	9.523574	10.476426	10.022948	9.977052	15	9
52	28	9.500721	10.499279	9.523679	10.476321	10.022959	9.977041	32	8
53	15	9.500815	10.499185	9.523785	10.476215	10.022970	9.977030	45	7
54	30	9.500910	10.499090	9.523890	10.476110	10.022980	9.977020	30	6
55	45	9.501004	10.498996	9.523995	10.476005	10.022991	9.977009	15	5
56	29	9.501099	10.498901	9.524100	10.475900	10.023001	9.976999	31	4
57	15	9.501193	10.498807	9.524205	10.475795	10.023012	9.976988	45	3
58	30	9.501288	10.498712	9.524310	10.475690	10.023022	9.976978	30	2
59	45	9.501382	10.498618	9.524415	10.475585	10.023033	9.976967	15	1
60	30	9.501476	10.498524	9.524520	10.475480	10.023043	9.976957	30	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
4h 46m.				LOG. SINES, &c.			71 deg.		

1h 14m.				LOG. SINES, &c.			18 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	30	9.501476	10.498524	9.524520	10.475480	10.023043	9.976957	30	60
1	15	9.501571	10.498429	9.524625	10.475375	10.023054	9.976946	45	59
2	30	9.501665	10.498335	9.524730	10.475270	10.023065	9.976935	30	58
3	45	9.501759	10.498241	9.524835	10.475165	10.023075	9.976925	15	57
4	31	9.501854	10.498146	9.524939	10.475061	10.023086	9.976914	29	56
5	15	9.501948	10.498052	9.525044	10.474956	10.023096	9.976904	45	55
6	30	9.502042	10.497958	9.525149	10.474851	10.023107	9.976893	30	54
7	45	9.502137	10.497863	9.525254	10.474746	10.023118	9.976882	15	53
8	32	9.502231	10.497769	9.525359	10.474641	10.023128	9.976872	28	52
9	15	9.502325	10.497675	9.525464	10.474536	10.023139	9.976861	45	51
10	30	9.502419	10.497581	9.525568	10.474432	10.023149	9.976851	30	50
11	45	9.502513	10.497487	9.525673	10.474327	10.023160	9.976840	15	49
12	33	9.502607	10.497393	9.525778	10.474222	10.023170	9.976830	27	48
13	15	9.502702	10.497298	9.525883	10.474117	10.023181	9.976819	45	47
14	30	9.502796	10.497204	9.525987	10.474013	10.023192	9.976808	30	46
15	45	9.502890	10.497110	9.526092	10.473908	10.023202	9.976798	15	45
16	34	9.502984	10.497016	9.526197	10.473803	10.023213	9.976787	26	44
17	15	9.503078	10.496922	9.526301	10.473699	10.023223	9.976777	45	43
18	30	9.503172	10.496828	9.526406	10.473594	10.023234	9.976766	30	42
19	45	9.503266	10.496734	9.526510	10.473490	10.023245	9.976755	15	41
20	35	9.503360	10.496640	9.526615	10.473385	10.023255	9.976745	25	40
21	15	9.503454	10.496546	9.526719	10.473281	10.023266	9.976734	45	39
22	30	9.503547	10.496453	9.526824	10.473176	10.023277	9.976723	30	38
23	45	9.503641	10.496359	9.526929	10.473071	10.023287	9.976713	15	37
24	36	9.503735	10.496265	9.527033	10.472967	10.023298	9.976702	24	36
25	15	9.503829	10.496171	9.527137	10.472863	10.023308	9.976692	45	35
26	30	9.503923	10.496077	9.527242	10.472758	10.023319	9.976681	30	34
27	45	9.504017	10.495983	9.527346	10.472654	10.023330	9.976670	15	33
28	37	9.504110	10.495890	9.527451	10.472549	10.023340	9.976660	23	32
29	15	9.504204	10.495796	9.527555	10.472445	10.023351	9.976649	45	31
30	30	9.504298	10.495702	9.527659	10.472341	10.023362	9.976638	30	30
31	45	9.504392	10.495608	9.527764	10.472236	10.023372	9.976628	15	29
32	38	9.504485	10.495515	9.527868	10 472132	10.023383	9.976617	22	28
33	15	9.504579	10.495421	9.527972	10.472028	10.023394	9.976606	45	27
34	30	9.504673	10.495327	9.528077	10 471923	10.023404	9.976596	30	26
35	45	9.504766	10.495234	9.528181	10 471819	10.023415	9.976585	15	25
36	39	9.504860	10.495140	9.528285	10.471715	10.023426	9.976574	21	24
37	15	9.504953	10.495047	9.528389	10.471611	10.023436	9.976564	45	23
38	30	9.505047	10.494953	9.528494	10.471506	10.023447	9.976553	30	22
39	45	9.505140	10.494860	9.528598	10.471402	10.023458	9.976542	15	21
40	40	9.505234	10.494766	9.528702	10.471298	10.023468	9.976532	20	20
41	15	9.505327	10.494673	9.528806	10.471194	10.023479	9.976521	45	19
42	30	9.505421	10.494579	9.528910	10.471090	10.023490	9.976510	30	18
43	45	9.505514	10.494486	9.529014	10.470986	10.023500	9.976500	15	17
44	41	9.505608	10.494392	9.529119	10.470881	10.023511	9.976489	19	16
45	15	9.505701	10.494299	9 529223	10.470777	10.023522	9.976478	45	15
46	30	9.505794	10.494206	9.529327	10.470673	10.023532	9.976468	30	14
47	45	9.505888	10.494112	9.529431	10.470569	10.023543	9.976457	15	13
48	42	9.505981	10.494019	9.529535	10.470465	10.023554	9.976446	18	12
49	15	9.506074	10.493926	9.529639	10.470361	10.023564	9.976436	45	11
50	30	9.506168	10.493832	9.529743	10.470257	10.023575	9.976425	30	10
51	45	9.506261	10.493739	9.529847	10.470153	10.023586	9.976414	15	9
52	43	9.506354	10.493646	9.529950	10.470050	10.023596	9.976404	17	8
53	15	9.506447	10.493553	9.530054	10.469946	10.023607	9.976393	45	7
54	30	9.506541	10.493459	9.530158	10.469842	10.023618	9.976382	30	6
55	45	9.506634	10.493366	9.530262	10.469738	10.023629	9.976371	15	5
56	44	9.506727	10.493273	9.530366	10.469634	10.023639	9.976361	16	4
57	15	9.506820	10.493180	9.530470	10.469530	10.023650	9.976350	45	3
58	30	9.506913	10.493087	9.530574	10.469426	10.023661	9.976339	30	2
59	45	9.507006	10.492994	9.530677	10.469323	10.023671	9.976329	15	1
60	45	9.507099	10.492901	9.530781	10.469219	10.023682	9.976318	15	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
4h 45m.				LOG. SINES, &c.			71 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	1h 15m.		LOG. SINES, &c.				18 deg.		
0	45	9.507099	10.492901	9.530781	10.469219	10.023682	9 976318	15	60
1	15	9.507192	10.492808	9.530885	10.469115	10.023693	9.976307	45	59
2	30	9.507285	10.492715	9 530989	10.469011	10.023704	9 976296	30	58
3	45	9.507378	10.492622	9.531092	10.468908	10.023714	9 976286	15	57
4	46	9.507471	10.492529	9.531196	10.468804	10.023725	9.976275	14	56
5	15	9.507564	10.492436	9.531300	10.468700	10.023736	9.976264	45	55
6	30	9.507657	10.492343	9.531403	10.468597	10.023746	9.976254	30	54
7	45	9.507750	10.492250	9.531507	10.468493	10.023757	9.976243	15	53
8	47	9.507843	10.492157	9.531611	10.468389	10.023768	9.976232	13	52
9	15	9.507936	10.492064	9.531714	10.468286	10.023779	9.976221	45	51
10	30	9.508028	10.491972	9.531818	10.468182	10.023789	9.976211	30	50
11	45	9.508121	10.491879	9.531921	10.468079	10.023800	9.976200	15	49
12	48	9.508214	10.491786	9.532025	10.467975	10.023811	9.976189	12	48
13	15	9.508307	10.491693	9.532128	10.467872	10.023822	9.976178	45	47
14	30	9.508400	10.491600	9.532232	10.467768	10.023832	9.976168	30	46
15	45	9 508492	10.491508	9.532335	10.467665	10.023843	9.976157	15	45
16	49	9.508585	10.491415	9.532439	10.467561	10.023854	9.976146	11	44
17	15	9.508678	10.491322	9.532542	10.467458	10.023865	9.976135	45	43
18	30	9.508770	10.491230	9.532646	10.467354	10.023876	9.976124	30	42
19	45	9.508863	10.491137	9.532749	10.467251	10.023886	9.976114	15	41
20	50	9.508956	10.491044	9.532853	10.467147	10.023897	9.976103	10	40
21	15	9.509048	10.490952	9.532956	10.467044	10.023908	9.976092	45	39
22	30	9.509141	10.490859	9.533059	10.466941	10.023919	9.976081	30	38
23	45	9.509233	10.490767	9.533163	10.466837	10.023929	9.976071	15	37
24	51	9.509326	10 490674	9.533266	10.466734	10.023940	9.976060	9	36
25	15	9.509418	10.490582	9.533369	10.466631	10.023951	9.976049	45	35
26	30	9.509511	10.490489	9.533472	10.466528	10.023962	9.976038	30	34
27	45	9.509603	10.490397	9.533576	10.466424	10.023973	9.976027	15	33
28	52	9.509696	10.490304	9.533679	10.466321	10.023983	9.976017	8	32
29	15	9.509788	10.490212	9.533782	10.466218	10.023994	9.976006	45	31
30	30	9.509880	10 490120	9.533885	10.466115	10.024005	9.975995	30	30
31	45	9.509973	10.490027	9.533988	10.466012	10.024016	9.975984	15	29
32	53	9.510065	10.489935	9.534092	10.465908	10.024026	9.975974	7	28
33	15	9.510157	10.489843	9.534195	10.465805	10.024037	9.975963	45	27
34	30	9.510250	10.489750	9.534298	10.465702	10.024048	9.975952	30	26
35	45	9.510342	10.489658	9.534401	10.465599	10 024059	9.975941	15	25
36	54	9.510434	10.489566	9.534504	10.465496	10.024070	9.975930	6	24
37	15	9.510526	10.489474	9.534607	10.465393	10.024081	9.975919	45	23
38	30	9.510619	10.489381	9.534710	10.465290	10.024091	9.975909	30	22
39	45	9.510711	10.489289	9.534813	10.465187	10.024102	9.975898	15	21
40	55	9.510803	10.489197	9.534916	10.465084	10.024113	9.975887	5	20
41	15	9.510895	10.489105	9.535019	10.464981	10.024124	9.975876	45	19
42	30	9.510987	10.489013	9.535122	10.464878	10.024135	9.975865	30	18
43	45	9.511079	10.488921	9.535225	10.464775	10.024145	9.975855	15	17
44	56	9.511172	10.488828	9.535328	10.464672	10.024156	9.975844	4	16
45	15	9.511264	10.488736	9.535431	10.464569	10.024167	9.975833	45	15
46	30	9.511356	10.488644	9.535534	10.464466	10.024178	9.975822	30	14
47	45	9 511448	10.488552	9.535636	10.464364	10.024189	9.975811	15	13
48	57	9.511540	10.488460	9.535739	10.464261	10.024200	9.975800	3	12
49	15	9.511632	10.488368	9.535842	10 464158	10.024211	9.975789	45	11
50	30	9.511724	10.488276	9.535945	10.464055	10.024221	9.975779	30	10
51	45	9.511815	10.488185	9.536048	10 463952	10.024232	9.975768	15	9
52	58	9.511907	10.488093	9.536150	10 463850	10.024243	9.975757	2	8
53	15	9.511999	10.488001	9.536253	10 463747	10.024254	9.975746	45	7
54	30	9.512091	10.487909	9.536356	10 463644	10.024265	9.975735	30	6
55	45	9.512183	10.487817	9.536459	10.463541	10.024276	9.975724	15	5
56	59	9.512275	10.487725	9.536561	10.463439	10.024287	9.975713	1	4
57	15	9.512367	10.487633	9.536664	10.463336	10.024297	9.975703	45	3
58	30	9.512458	10.487542	9.536767	10.463233	10.024308	9.975692	30	2
59	45	9.512550	10.487450	9.536869	10.463131	10.024319	9.975681	15	1
60	60	9.512642	10.487358	9.536972	10.463028	10.024330	9.975670	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	4h 44m.		LOG. SINES, &c.				71 deg.		

1h 16m.				LOG. SINES, &c.			19 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant	cosine.	″ ′	sec.
0	0	9.512642	10.487358	9.536972	10.463028	10.024330	9.975670	60	60
1	15	9.512734	10.487266	9.537074	10.462926	10.024341	9.975659	45	59
2	30	9.512825	10.487175	9.537177	10.462823	10.024352	9.975648	30	58
3	45	9.512917	10.487083	9.537280	10.462720	10.024363	9.975637	15	57
4	1	9.513009	10.486991	9.537382	10.462618	10.024374	9.975626	59	56
5	15	9.513100	10.486900	9.537485	10.462515	10.024384	9.975616	45	55
6	30	9.513192	10.486808	9.537587	10.462413	10.024395	9.975605	30	54
7	45	9.513283	10.486717	9.537690	10.462310	10.024406	9.975594	15	53
8	2	9.513375	10.486625	9.537792	10.462208	10.024417	9.975583	58	52
9	15	9.513466	10.486534	9.537894	10.462106	10.024428	9.975572	45	51
10	30	9.513558	10.486442	9.537997	10.462003	10.024439	9.975561	30	50
11	45	9.513650	10.486350	9.538099	10.461901	10.024450	9.975550	15	49
12	3	9.513741	10.486259	9.538202	10.461798	10.024461	9.975539	57	48
13	15	9.513832	10.486168	9.538304	10.461696	10.024472	9.975528	45	47
14	30	9.513924	10.486076	9.538406	10.461594	10.024482	9.975518	30	46
15	45	9.514015	10.485985	9.538509	10.461491	10.024493	9.975507	15	45
16	4	9.514107	10.485893	9.538611	10.461389	10.024504	9.975496	56	44
17	15	9.514198	10.485802	9.538713	10.461287	10.024515	9.975485	45	43
18	30	9.514289	10.485711	9.538815	10.461185	10.024526	9.975474	30	42
19	45	9.514381	10.485619	9.538918	10.461082	10.024537	9.975463	15	41
20	5	9.514472	10.485528	9.539020	10.460980	10.024548	9.975452	55	40
21	15	9.514563	10.485437	9.539122	10.460878	10.024559	9.975441	45	39
22	30	9.514655	10.485345	9.539224	10.460776	10.024570	9.975430	30	38
23	45	9.514746	10.485254	9.539327	10.460673	10.024581	9.975419	15	37
24	6	9.514837	10.485163	9.539429	10.460571	10.024592	9.975408	54	36
25	15	9.514928	10.485072	9.539531	10.460469	10.024603	9.975397	45	35
26	30	9.515019	10.484981	9.539633	10.460367	10.024614	9.975386	30	34
27	45	9.515111	10.484889	9.539735	10.460265	10.024625	9.975375	15	33
28	7	9.515202	10.484798	9.539837	10.460163	10.024635	9.975365	53	32
29	15	9.515293	10.484707	9.539939	10.460061	10.024646	9.975354	45	31
30	30	9.515384	10.484616	9.540041	10.459959	10.024657	9.975343	30	30
31	45	9.515475	10.484525	9.540143	10.459857	10.024668	9.975332	15	29
32	8	9.515566	10.484434	9.540245	10.459755	10.024679	9.975321	52	28
33	15	9.515657	10.484343	9.540347	10.459653	10.024690	9.975310	45	27
34	30	9.515748	10.484252	9.540449	10.459551	10.024701	9.975299	30	26
35	45	9.515839	10.484161	9.540551	10.459449	10.024712	9.975288	15	25
36	9	9.515930	10.484070	9.540653	10.459347	10 024723	9.975277	51	24
37	15	9.516021	10.483979	9.540755	10.459245	10.024734	9.975266	45	23
38	30	9.516112	10.483888	9.540857	10.459143	10.024745	9.975255	30	22
39	45	9.516203	10.483797	9.540959	10.459041	10.024756	9.975244	15	21
40	10	9.516294	10.483706	9.541061	10.458939	10.024767	9.975233	50	20
41	15	9.516384	10.483616	9.541162	10.458838	10.024778	9.975222	45	19
42	30	9.516475	10.483525	9.541264	10.458736	10.024789	9.975211	30	18
43	45	9.516566	10.483434	9.541366	10.458634	10.024800	9.975200	15	17
44	11	9.516657	10.483343	9.541468	10.458532	10.024811	9.975189	49	16
45	15	9.516748	10.483252	9.541570	10.458430	10.024822	9.975178	45	15
46	30	9.516838	10.483162	9.541671	10.458329	10.024833	9.975167	30	14
47	45	9.516929	10.483071	9.541773	10.458227	10.024844	9.975156	15	13
48	12	9.517020	10.482980	9.541875	10.458125	10.024855	9.975145	48	12
49	15	9.517110	10.482890	9.541976	10.458024	10.024866	9.975134	45	11
50	30	9.517201	10.482799	9.542078	10.457922	10.024877	9.975123	30	10
51	45	9.517292	10.482708	9.542180	10.457820	10.024888	9.975112	15	9
52	13	9.517382	10.482618	9.542281	10.457719	10.024899	9.975101	47	8
53	15	9.517473	10.482527	9.542383	10.457617	10.024910	9.975090	45	7
54	30	9.517564	10.482436	9.542484	10.457516	10.024921	9.975079	30	6
55	45	9.517654	10.482346	9.542586	10.457414	10.024932	9.975068	15	5
56	14	9.517745	10.482255	9.542688	10.457312	10.024943	9.975057	46	4
57	15	9.517835	10.482165	9.542789	10.457211	10.024954	9.975046	45	3
58	30	9.517926	10.482074	9.542891	10.457109	10.024965	9.975035	30	2
59	45	9.518016	10.481984	9.542992	10.457008	10.024976	9.975024	15	1
60	15	9.518107	10.481893	9.543094	10.456906	10.024987	9.975013	45	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
4h 43m.				LOG. SINES, &c.			70 deg.		

1h 17m.			LOG. SINES, &c.				19 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	15	9.518107	10.481893	9.543094	10.456906	10.024987	9.975013	45	60
1	15	9.518197	10.481803	9.543195	10.456805	10.024998	9.975002	45	59
2	30	9.518287	10.481713	9.543297	10.456703	10.025009	9.974991	30	58
3	45	9.518378	10.481622	9.543398	10.456602	10.025020	9.974980	15	57
4	16	9.518468	10 481532	9.543499	10.456501	10.025031	9.974969	44	56
5	15	9.518559	10.481441	9.543601	10.456399	10 025042	9.974958	45	55
6	30	9.518649	10.481351	9.543702	10.456298	10.025053	9.974947	30	54
7	45	9.518739	10.481261	9.543803	10.456197	10.025064	9.974936	15	53
8	17	9.518829	10.481171	9.543905	10.456095	10.025075	9.974925	43	52
9	15	9.518920	10.481080	9.544006	10.455994	10.025086	9.974914	45	51
10	30	9.519010	10.480990	9.544107	10.455893	10.025098	9.974902	30	50
11	45	9.519100	10.480900	9.544209	10.455791	10.025109	9.974891	15	49
12	18	9.519190	10.480810	9.544310	10.455690	10.025120	9.974880	42	48
13	15	9.519281	10.480719	9.544411	10.455589	10.025131	9.974869	45	47
14	30	9.519371	10.480629	9.544512	10.455488	10.025142	9.974858	30	46
15	45	9.519461	10.480539	9.544614	10.455386	10.025153	9.974847	15	45
16	19	9.519551	10.480449	9.544715	10.455285	10.025164	9.974836	41	44
17	15	9.519641	10.480359	9.544816	10.455184	10.025175	9.974825	45	43
18	30	9.519731	10.480269	9.544917	10.455083	10.025186	9.974814	30	42
19	45	9.519821	10.480179	9.545018	10.454982	10.025197	9.974803	15	41
20	20	9.519911	10.480089	9.545119	10.454881	10.025208	9.974792	40	40
21	15	9.520001	10.479999	9.545220	10.454780	10.025219	9.974781	45	39
22	30	9.520091	10.479909	9.545321	10.454679	10.025230	9.974770	30	38
23	45	9.520181	10.479819	9.545423	10.454577	10.025241	9.974759	15	37
24	21	9.520271	10.479729	9.545524	10.454476	10.025253	9.974747	39	36
25	15	9.520361	10.479639	9.545625	10.454375	10.025264	9.974736	45	35
26	30	9.520451	10.479549	9.545726	10.454274	10.025275	9.974725	30	34
27	45	9.520541	10.479459	9.545827	10.454173	10.025286	9.974714	15	33
28	22	9.520631	10.479369	9.545928	10.454072	10.025297	9.974703	38	32
29	15	9.520720	10.479280	9.546028	10.453972	10.025308	9.974692	45	31
30	30	9.520810	10.479190	9.546129	10.453871	10.025319	9.974681	30	30
31	45	9.520900	10.479100	9.546230	10.453770	10.025330	9.974670	15	29
32	23	9.520990	10.479010	9.546331	10.453669	10.025341	9.974659	37	28
33	15	9.521080	10.478920	9.546432	10.453568	10.025352	9.974648	45	27
34	30	9.521169	10.478831	9.546533	10.453467	10.025364	9.974636	30	26
35	45	9.521259	10.478741	9.546634	10.453366	10.025375	9.974625	15	25
36	24	9.521349	10.478651	9.546735	10.453265	10.025386	9.974614	36	24
37	15	9.521438	10.478562	9.546835	10.453165	10.025397	9.974603	45	23
38	30	9.521528	10.478472	9.546936	10.453064	10.025408	9.974592	30	22
39	45	9.521618	10.478382	9.547037	10.452963	10.025419	9.974581	15	21
40	25	9.521707	10.478293	9.547138	10.452862	10.025430	9.974570	35	20
41	15	9.521797	10.478203	9.547238	10.452762	10.025441	9.974559	45	19
42	30	9.521886	10.478114	9.547339	10.452661	10.025453	9.974547	30	18
43	45	9.521976	10.478024	9.547440	10.452560	10.025464	9.974536	15	17
44	26	9.522066	10.477934	9.547540	10.452460	10.025475	9.974525	34	16
45	15	9.522155	10.477845	9.547641	10.452359	10.025486	9.974514	45	15
46	30	9.522245	10.477755	9.547742	10.452258	10.025497	9.974503	30	14
47	45	9.522334	10.477666	9.547842	10.452158	10.025508	9.974492	15	13
48	27	9.522423	10.477577	9.547943	10.452057	10.025519	9.974481	33	12
49	15	9.522513	10.477487	9.548043	10.451957	10.025531	9.974469	45	11
50	30	9.522602	10.477398	9.548144	10.451856	10.025542	9.974458	30	10
51	45	9.522692	10.477308	9.548245	10.451755	10.025553	9.974447	15	9
52	28	9.522781	10.477219	9.548345	10.451655	10.025564	9.974436	32	8
53	15	9.522870	10.477130	9.548446	10.451554	10.025575	9.974425	45	7
54	30	9.522960	10.477040	9.548546	10.451454	10.025586	9.974414	30	6
55	45	9.523049	10.476951	9.548647	10.451353	10.025598	9.974402	15	5
56	29	9.523138	10.476862	9.548747	10.451253	10 025609	9.974391	31	4
57	15	9.523228	10.476772	9.548847	10.451153	10.025620	9.974380	45	3
58	30	9.523317	10.476683	9.548948	10.451052	10.025631	9.974369	30	2
59	45	9.523406	10.476594	9.549048	10.450952	10.025642	9.974358	15	1
60	30	9.523496	10.476505	9.549149	10.450851	10.025653	9.974347	30	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent	cosecant.	sine	″ ′	sec.
4h 42m.			LOG. SINES, &c.				70 deg.		

1h 18m.			LOG. SINES, &c.				19 deg.		
sec.	′ ″	sine.	cosecant	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	30	9.523495	10.476505	9.549145	10.450851	10.025653	9.974347	30	60
1	15	9.523584	10.476416	9.549249	10.450751	10.025665	9.974335	45	59
2	30	9.523674	10.476326	9.549349	10.450651	10.025676	9.974324	30	58
3	45	9.523763	10.476237	9.549450	10.450550	10.025687	9.974313	15	57
4	31	9.523852	10.476148	9.549550	10.450450	10.025698	9.974302	29	56
5	15	9.523941	10.476059	9.549650	10.450350	10.025709	9.974291	45	55
6	30	9.524030	10.475970	9.549751	10.450249	10.025721	9.974279	30	54
7	45	9.524119	10.475881	9.549851	10.450149	10.025732	9.974268	15	53
8	32	9.524208	10.475792	9.549951	10.450049	10.025743	9.974257	28	52
9	15	9.524297	10.475703	9.550051	10.449949	10.025754	9.974246	45	51
10	30	9.524386	10.475614	9.550151	10.449849	10.025765	9.974235	30	50
11	45	9.524475	10.475525	9.550252	10.449748	10.025777	9.974223	15	49
12	33	9.524564	10.475436	9.550352	10.449648	10.025788	9.974212	27	48
13	15	9.524653	10.475347	9.550452	10.449548	10.025799	9.974201	45	47
14	30	9.524742	10.475258	9.550552	10.449448	10.025810	9.974190	30	46
15	45	9.524831	10.475169	9.550652	10.449348	10.025822	9.974178	15	45
16	34	9.524920	10.475080	9.550752	10.449248	10.025833	9.974167	26	44
17	15	9.525008	10.474992	9.550852	10.449148	10.025844	9.974156	45	43
18	30	9.525097	10.474903	9.550952	10.449048	10.025855	9.974145	30	42
19	45	9.525186	10.474814	9.551052	10.448948	10.025866	9.974134	15	41
20	35	9.525275	10.474725	9.551152	10.448848	10.025878	9.974122	25	40
21	15	9.525364	10.474636	9.551252	10.448748	10.025889	9.974111	45	39
22	30	9.525452	10.474548	9.551352	10.448648	10.025900	9.974100	30	38
23	45	9.525541	10.474459	9.551452	10.448548	10.025911	9.974089	15	37
24	36	9.525630	10.474370	9.551552	10.448448	10.025923	9.974077	24	36
25	15	9.525718	10.474282	9.551652	10.448348	10.025934	9.974066	45	35
26	30	9.525807	10.474193	9.551752	10.448248	10.025945	9.974055	30	34
27	45	9.525896	10.474104	9.551852	10.448148	10.025956	9.974044	15	33
28	37	9.525984	10.474016	9.551952	10.448048	10.025968	9.974032	23	32
29	15	9.526073	10.473927	9.552052	10.447948	10.025979	9.974021	45	31
30	30	9.526162	10.473838	9.552152	10.447848	10.025990	9.974010	30	30
31	45	9.526250	10.473750	9.552252	10.447748	10.026001	9.973999	15	29
32	38	9.526339	10.473661	9.552351	10.447649	10.026013	9.973987	22	28
33	15	9.526427	10.473573	9.552451	10.447549	10.026024	9.973976	45	27
34	30	9.526516	10.473484	9.552551	10.447449	10.026035	9.973965	30	26
35	45	9.526604	10.473396	9.552651	10.447349	10.026047	9.973953	15	25
36	39	9.526693	10.473307	9.552750	10.447250	10.026058	9.973942	21	24
37	15	9.526781	10.473219	9.552850	10.447150	10.026069	9.973931	45	23
38	30	9.526870	10.473130	9.552950	10.447050	10.026080	9.973920	30	22
39	45	9.526958	10.473042	9.553050	10.446950	10.026092	9.973908	15	21
40	40	9.527046	10.472954	9.553149	10.446851	10.026103	9.973897	20	20
41	15	9.527135	10.472865	9.553249	10.446751	10.026114	9.973886	45	19
42	30	9.527223	10.472777	9.553348	10.446652	10.026126	9.973874	30	18
43	45	9.527311	10.472689	9.553448	10.446552	10.026137	9.973863	15	17
44	41	9.527400	10.472600	9.553548	10.446452	10.026148	9.973852	19	16
45	15	9.527488	10.472512	9.553647	10.446353	10.026159	9.973841	45	15
46	30	9.527576	10.472424	9.553747	10.446253	10.026171	9.973829	30	14
47	45	9.527664	10.472336	9.553846	10.446154	10.026182	9.973818	15	13
48	42	9.527753	10.472247	9.553946	10.446054	10.026193	9.973807	18	12
49	15	9.527841	10.472159	9.554045	10.445955	10.026205	9.973795	45	11
50	30	9.527929	10.472071	9.554145	10.445855	10.026216	9.973784	30	10
51	45	9.528017	10.471983	9.554244	10.445756	10.026227	9.973773	15	9
52	43	9.528105	10.471895	9.554344	10.445656	10.026239	9.973761	17	8
53	15	9.528193	10.471807	9.554443	10.445557	10.026250	9.973750	45	7
54	30	9.528281	10.471719	9.554543	10.445457	10.026261	9.973739	30	6
55	45	9.528370	10.471630	9.554642	10.445358	10.026273	9.973727	15	5
56	44	9.528458	10.471542	9.554741	10.445259	10.026284	9.973716	16	4
57	15	9.528546	10.471454	9.554841	10.445159	10.026295	9.973705	45	3
58	30	9.528634	10.471366	9.554940	10.445060	10.026307	9.973693	30	2
59	45	9.528722	10.471278	9.555039	10.444961	10.026318	9.973682	15	1
60	45	9.528810	10.471190	9.555139	10.444861	10.026329	9.973671	15	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
4h 41m.			LOG. SINES, &c.				70 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine	″ ′	sec.
1h 19m.			LOG. SINES, &c.				19 deg.		
0	45	9 528810	10.471190	9.555139	10 444861	10.026329	9.973671	15	60
1	15	9.528898	10.471102	9.555238	10.444762	10.026341	9 973659	45	59
2	30	9.528986	10.471014	9 555337	10.444663	10.026352	9.973648	30	58
3	45	9.529073	10.470927	9.555437	10.444563	10.026363	9.973637	15	57
4	46	9.529161	10.470839	9.555536	10.444464	10.026375	9.973625	14	56
5	15	9.529249	10.470751	9.555635	10.444365	10.026386	9.973614	45	55
6	30	9.529337	10.470663	9.555734	10.444266	10.026397	9.973603	30	54
7	45	9.529425	10.470575	9.555833	10.444167	10.026409	9.973591	15	53
8	47	9.529513	10.470487	9.555933	10.444067	10.026420	9.973580	13	52
9	15	9.529601	10.470399	9.556032	10.443968	10.026431	9.973569	45	51
10	30	9.529688	10.470312	9.556131	10.443869	10.026443	9.973557	30	50
11	45	9.529776	10.470224	9.556230	10.443770	10.026454	9.973546	15	49
12	48	9.529864	10.470136	9.556329	10.443671	10.026465	9.973535	12	48
13	15	9.529951	10.470049	9.556428	10.443572	10.026477	9.973523	45	47
14	30	9.530039	10.469961	9.556527	10.443473	10.026488	9.973512	30	46
15	45	9.530127	10.469873	9.556626	10.443374	10.026500	9.973500	15	45
16	49	9.530215	10.469785	9.556725	10.443275	10.026511	9.973489	11	44
17	15	9.530302	10.469698	9.556824	10.443176	10.026522	9.973478	45	43
18	30	9.530390	10.469610	9 556923	10.443077	10.026534	9.973466	30	42
19	45	9.530477	10.469523	9.557022	10.442978	10.026545	9.973455	15	41
20	50	9.530565	10.469435	9.557121	10.442879	10.026557	9.973443	10	40
21	15	9.530652	10.469348	9.557220	10.442780	10.026568	9.973432	45	39
22	30	9.530740	10.469260	9.557319	10.442681	10.026579	9.973421	30	38
23	45	9.530828	10.469172	9.557418	10.442582	10.026591	9.973409	15	37
24	51	9.530915	10.469085	9.557517	10.442483	10.026602	9.973398	9	36
25	15	9.531002	10.468998	9.557616	10.442384	10.026613	9.973387	45	35
26	30	9.531090	10.468910	9.557715	10.442285	10.026625	9.973375	30	34
27	45	9.531177	10.468823	9.557814	10.442186	10.026636	9.973364	15	33
28	52	9.531265	10.468735	9.557912	10.442088	10.026648	9.973352	8	32
29	15	9.531352	10.468648	9.558011	10.441989	10.026659	9.973341	45	31
30	30	9.531440	10.468560	9.558110	10.441890	10.026671	9.973329	30	30
31	45	9.531527	10.468473	9.558209	10.441791	10.026682	9.973318	15	29
32	53	9.531614	10.468386	9.558308	10.441692	10.026693	9.973307	7	28
33	15	9.531702	10.468298	9.558406	10.441594	10.026705	9.973295	45	27
34	30	9.531789	10.468211	9.558505	10.441495	10.026716	9.973284	30	26
35	45	9.531876	10.468124	9.558604	10.441396	10.026728	9.973272	15	25
36	54	9 531963	10.468037	9.558702	10 441298	10 026739	9.973261	6	24
7	15	9.532051	10.467949	9.558801	10.441199	10.026751	9.973249	45	23
38	30	9.532138	10.467862	9.558900	10.441100	10.026762	9.973238	30	22
39	45	9.532225	10.467775	9.558998	10.441002	10.026773	9.973227	15	21
40	55	9.532312	10.467688	9.559097	10.440903	10.026785	9.973215	5	20
41	15	9.532399	10.467601	9.559196	10.440804	10.026796	9.973204	45	19
42	30	9.532487	10.467513	9.559294	10.440706	10.026808	9.973192	30	18
43	45	9.532574	10.467426	9.559393	10.440607	10.026819	9.973181	15	17
44	56	9.532661	10.467339	9.559491	10.440509	10.026831	9.973169	4	16
45	15	9.532748	10.467252	9.559590	10.440410	10.026842	9 973158	45	15
46	30	9.532835	10.467165	9.559688	10.440312	10 026854	9.973146	30	14
47	45	9.532922	10.467078	9.559787	10.440213	10.026865	9.973135	15	13
48	57	9 533009	10.466991	9.559885	10.440115	10.026876	9.973124	3	12
49	15	9.533096	10.466904	9.559984	10.440016	10.026886	9.973112	45	11
50	30	9.533183	10.466817	9.560082	10.439918	10.026899	9.973101	30	10
51	45	9.533270	10.466730	9.560181	10.439819	10.026911	9.973089	15	9
52	58	9.533357	10.466643	9.560279	10.439721	10.026922	9.973078	2	8
53	15	9.533444	10.466556	9.560378	10.439622	10.026934	9.973066	45	7
54	30	9.533531	10.466469	9.560476	10.439524	10.026945	9.973055	30	6
55	45	9.533618	10.466382	9.560574	10.439426	10.026957	9.973043	15	5
56	59	9.533704	10.466296	9.560673	10.439327	10.026968	9.973032	1	4
57	15	9.533791	10.466209	9.560771	10.439229	10.026980	9.973020	45	3
58	30	9 533878	10.466122	9.560869	10.439131	10 026991	9.973009	30	2
59	45	9.533965	10.466035	9.560968	10.439032	10.027003	9.972997	15	1
60	60	9.534052	10.465948	9.561066	10.438934	10.027014	9.972986	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
4h 40m			LOG. SINES, &c.				70 deg.		

sec.	′ ″	sine.	cosecant	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	$1^h\ 20^m$.		LOG. SINES, &c.					20 deg.	
0	0	9.534052	10.465948	9.561066	10.438934	10.027014	9.972986	60	60
1	15	9.534138	10.465862	9.561164	10.438836	10.027026	9.972974	45	59
2	30	9.534225	10.465775	9.561262	10.438738	10.027037	9.972963	30	58
3	45	9.534312	10.465688	9.561361	10.438639	10.027049	9.972951	15	57
4	1	9.534399	10.465601	9.561459	10.438541	10.027060	9.972940	59	56
5	15	9.534485	10.465515	9.561557	10.438443	10.027072	9.972928	45	55
6	30	9.534572	10.465428	9.561655	10.438345	10.027083	9.972917	30	54
7	45	9.534659	10.465341	9.561753	10 438247	10.027095	9.972905	15	53
8	2	9.534745	10.465255	9.561851	10.438149	10.027106	9.972894	58	52
9	15	9.534832	10.465168	9.561950	10.438050	10.027118	9.972882	45	51
10	30	9.534918	10.465082	9.562048	10.437952	10.027129	9.972871	30	50
11	45	9.535005	10.464995	9.562146	10.437854	10.027141	9.972859	15	49
12	3	9.535091	10.464909	9.562244	10 437756	10.027152	9.972848	57	48
13	15	9.535178	10.464822	9.562342	10.437658	10.027164	9.972836	45	47
14	30	9.535265	10.464735	9.562440	10.437560	10.027175	9.972825	30	46
15	45	9.535351	10.464649	9.562538	10.437462	10.027187	9.972813	15	45
16	4	9.535437	10.464563	9.562636	10.437364	10.027198	9.972802	56	44
17	15	9.535524	10.464476	9.562734	10.437266	10 027210	9.972790	45	43
18	30	9.535610	10.464390	9.562832	10.437168	10.027222	9.972778	30	42
19	45	9.535697	10.464303	9.562930	10.437070	10.027233	9.972767	15	41
20	5	9.535783	10.464217	9.563028	10.436972	10.027245	9.972755	55	40
21	15	9.535870	10.464130	9.563126	10.436874	10.027256	9.972744	45	39
22	30	9.535956	10.464044	9.563224	10.436776	10.027268	9.972732	30	38
23	45	9.536042	10.463958	9.563321	10.436679	10.027279	9.972721	15	37
24	6	9.536129	10.463871	9.563419	10.436581	10.027291	9.972709	54	36
25	15	9.536215	10.463785	9.563517	10.436483	10.027302	9.972698	45	35
26	30	9.536301	10.463699	9.563615	10.436385	10.027314	9.972686	30	34
27	45	9.536387	10.463613	9.563713	10.436287	10.027326	9.972674	15	33
28	7	9.536474	10.463526	9.563811	10.436189	10.027337	9.972663	53	32
29	15	9.536560	10.463440	9.563908	10 436092	10.027349	9.972651	45	31
30	30	9.536646	10.463354	9.564006	10.435994	10.027360	9.972640	30	30
31	45	9.536732	10.463268	9.564104	10.435896	10.027372	9.972628	15	29
32	8	9.536818	10 463182	9 564202	10 435798	10.027383	9.972617	52	28
33	15	9.536904	10.463096	9.564299	10.435701	10.027395	9.972605	45	27
34	30	9.536991	10.463009	9.564397	10.435603	10.027407	9.972593	30	26
35	45	9.537077	10.462923	9.564495	10.435505	10.027418	9.972582	15	25
36	9	9.537163	10.462837	9.564592	10.435408	10.027430	9.972570	51	24
37	15	9.537249	10.462751	9.564690	10.435310	10.027441	9.972559	45	23
38	30	9.537335	10.462665	9.564788	10.435212	10.027453	9.972547	30	22
39	45	9.537421	10.462579	9.564885	10.435115	10.027465	9.972535	15	21
40	10	9.537507	10.462493	9.564983	10.435017	10.027476	9.972524	50	20
41	15	9.537593	10.462407	9.565081	10.434919	10.027488	9.972512	45	19
42	30	9.537679	10.462321	9.565178	10.434822	10.027499	9.972501	30	18
43	45	9.537765	10.462235	9·565276	10.434724	10.027511	9.972489	15	17
44	11	9.537851	10.462149	9.565373	10.434627	10.027523	9.972477	49	16
45	15	9.537937	10.462063	9.565471	10.434529	10.027534	9.972466	45	15
46	30	9.538023	10.461977	9.565568	10.434432	10.027546	9.972454	30	14
47	45	9.538108	10.461892	9.565666	10.434334	10.027557	9.972443	15	13
48	12	9.538194	10.461806	9.565763	10.434237	10.027569	9.972431	48	12
49	15	9.538280	10.461720	9.565861	10.434139	10.027581	9.972419	45	11
50	30	9.538366	10.461634	9.565958	10.434042	10.027592	9.972408	30	10
51	45	9.538452	10.461548	9.566056	10.433944	10.027604	9.972396	15	9
52	13	9.538537	10.461463	9.566153	10.433847	10.027616	9.972384	47	8
53	15	9.538623	10.461377	9.566250	10.433750	10.027627	9.972373	45	7
54	30	9.538709	10.461291	9.566348	10.433652	10.027639	9.972361	30	6
55	45	9.538795	10.461205	9.566445	10.433555	10.027650	9.972350	15	5
56	14	9.538880	10.461120	9.566542	10.433458	10.027662	9.972338	46	4
57	15	9.538966	10.461034	9.566640	10.433360	10.027674	9.972326	45	3
58	30	9.539052	10.460948	9.566737	10.433263	10.027685	9.972315	30	2
59	45	9.539137	10.460863	9.566834	10.433166	10.027697	9.972303	15	1
60	15	9.539223	10.460777	9.566932	10.433068	10.027709	9.972291	45	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$4^h\ 39^m$.		LOG. SINES, &c.					69 deg.	

1h 21m.			LOG. SINES, &c.			20 deg.			
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	15	9.539223	10.460777	9.566932	10.433068	10.027709	9.972291	45	60
1	15	9.539309	10.460691	9.567029	10.432971	10.027720	9.972280	45	59
2	30	9.539394	10.460606	9.567126	10.432874	10.027732	9.972268	30	58
3	45	9.539480	10.460520	9.567223	10.432777	10.027744	9.972256	15	57
4	16	9.539565	10.460435	9.567320	10.432680	10.027755	9.972245	44	56
5	15	9.539651	10.460349	9.567418	10.432582	10.027767	9.972233	45	55
6	30	9.539736	10.460264	9.567515	10.432485	10.027779	9.972221	30	54
7	45	9.539822	10.460178	9.567612	10.432388	10.027790	9.972210	15	53
8	17	9.539907	10.460093	9.567709	10.432291	10.027802	9.972198	43	52
9	15	9.539993	10.460007	9.567806	10.432194	10.027814	9.972186	45	51
10	30	9.540078	10.459922	9.567903	10.432097	10.027825	9.972175	30	50
11	45	9.540163	10.459837	9.568000	10.432000	10.027837	9.972163	15	49
12	18	9.540249	10.459751	9.568097	10.431903	10.027849	9.972151	42	48
13	15	9.540334	10.459666	9.568195	10.431805	10.027860	9.972140	45	47
14	30	9.540420	10.459580	9.568292	10.431708	10.027872	9.972128	30	46
15	45	9.540505	10.459495	9.568389	10.431611	10.027884	9.972116	15	45
16	19	9.540590	10.459410	9.568486	10.431514	10.027895	9.972105	41	44
17	15	9.540676	10.459324	9.568583	10.431417	10.027907	9.972093	45	43
18	30	9.540761	10.459239	9.568680	10.431320	10.027919	9.972081	30	42
19	45	9.540846	10.459154	9.568777	10 431223	10.027930	9.972070	15	41
20	20	9.540931	10.459069	9.568873	10.431127	10.027942	9.972058	40	40
21	15	9.541017	10.458983	9.568970	10.431030	10.027954	9.972046	45	39
22	30	9.541102	10.458898	9.569067	10.430933	10.027966	9.972034	30	38
23	45	9.541187	10.458813	9.569164	10.430836	10.027977	9.972023	15	37
24	21	9.541272	10.458728	9.569261	10.430739	10.027989	9.972011	39	36
25	15	9.541357	10.458643	9.569358	10.430642	10.028001	9.971999	45	35
26	30	9.541442	10.458558	9.569455	10.430545	10.028012	9.971988	30	34
27	45	9.541527	10.458473	9.569552	10.430448	10.028024	9.971976	15	33
28	22	9.541613	10.458387	9.569648	10.430352	10.028036	9.971964	38	32
29	15	9.541698	10.458302	9.569745	10.430255	10.028048	9.971952	45	31
30	30	9.541783	10.458217	9.569842	10.430158	10.028059	9.971941	30	30
31	45	9.541868	10.458132	9.569939	10.430061	10.028071	9.971929	15	29
32	23	9.541953	10.458047	9.570035	10.429965	10.028083	9.971917	37	28
33	15	9.542038	10.457962	9.570132	10.429868	10.028095	9.971905	45	27
34	30	9.542123	10.457877	9.570229	10.429771	10.028106	9.971894	30	26
35	45	9.542208	10.457792	9.570326	10.429674	10.028118	9.971882	15	25
36	24	9.542293	10.457707	9.570422	10.429578	10.028130	9.971870	36	24
37	15	9.542377	10.457623	9.570519	10.429481	10.028142	9.971858	45	23
38	30	9.542462	10.457538	9.570616	10.429384	10.028153	9.971847	30	22
39	45	9.542547	10.457453	9.570712	10.429288	10.028165	9.971835	15	21
40	25	9.542632	10.457368	9.570809	10.429191	10.028177	9.971823	35	20
41	15	9.542717	10.457283	9.570905	10.429095	10.028189	9.971811	45	19
42	30	9.542802	10.457198	9.571002	10.428998	10.028200	9.971800	30	18
43	45	9.542887	10.457113	9.571099	10.428901	10.028212	9.971788	15	17
44	26	9.542971	10.457029	9.571195	10.428805	10.028224	9.971776	34	16
45	15	9.543056	10.456944	9.571292	10.428708	10.028236	9.971764	45	15
46	30	9.543141	10.456859	9.571388	10.428612	10.028247	9.971753	30	14
47	45	9.543226	10.456774	9.571485	10.428515	10.028259	9.971741	15	13
48	27	9.543310	10.456690	9.571581	10.428419	10.028271	9.971729	33	12
49	15	9.543395	10.456605	9.571678	10.428322	10.028283	9.971717	45	11
50	30	9.543480	10.456520	9.571774	10.428226	10.028294	9.971706	30	10
51	45	9.543564	10.456436	9.571870	10.428130	10.028306	9.971694	15	9
52	28	9.543649	10.456351	9.571967	10.428033	10.028318	9.971682	32	8
53	15	9.543733	10.456267	9.572063	10.427937	10.028330	9.971670	45	7
54	30	9.543818	10.456182	9.572160	10.427840	10.028342	9.971658	30	6
55	45	9.543903	10.456097	9.572256	10.427744	10.028353	9.971647	15	5
56	29	9.543987	10.456013	9.572352	10.427648	10.028365	9.971635	31	4
57	15	9.544072	10.455928	9.572449	10.427551	10.028377	9.971623	45	3
58	30	9.544156	10.455844	9.572545	10.427455	10.028389	9.971611	30	2
59	45	9.544241	10.455759	9.572641	10.427359	10.028401	9.971599	15	1
60	30	9.544325	10.455675	9.572738	10.427262	10.028412	9.971588	30	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
4h 38m.			LOG. SINES, &c.			69 deg.			

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
1h 22m.		LOG. SINES, &c.						20 deg.	
0	30	9.544325	10.455675	9.572738	10.427262	10.028412	9.971588	30	60
1	15	9.544410	10.455590	9.572834	10.427166	10.028424	9.971576	45	59
2	30	9.544404	10.455506	9.572930	10.427070	10.028436	9.971564	30	58
3	45	9.544579	10.455421	9.573026	10.426974	10.028448	9.971552	15	57
4	31	9.544663	10.455337	9.573123	10.426877	10.028460	9 971540	29	56
5	15	9.544747	10.455253	9.573219	10.426781	10.028471	9.971529	45	55
6	30	9.544832	10.455168	9.573315	10.426685	10.028483	9.971517	30	54
7	45	9.544916	10.455084	9.573411	10.426589	10.028495	9.971505	15	53
8	32	9.545000	10.455000	9.573507	10.426493	10.028507	9.971493	28	52
9	15	9.545085	10.454915	9.573603	10.426397	10.028519	9.971481	45	51
10	30	9.545169	10.454831	9.573700	10.426300	10.028531	9.971469	30	50
11	45	9.545253	10.454747	9.573796	10.426204	10.028542	9.971458	15	49
12	33	9.545338	10.454662	9.573892	10.426108	10.028554	9.971446	27	48
13	15	9.545422	10.454578	9.573988	10.426012	10.028566	9.971434	45	47
14	30	9.545506	10.454494	9.574084	10.425916	10.028578	9.971422	30	46
15	45	9.545590	10.454410	9.574180	10.425820	10.028590	9.971410	15	45
16	34	9.545674	10.454326	9.574276	10.425724	10.028602	9.971398	26	44
17	15	9.545759	10.454241	9.574372	10.425628	10.028614	9.971386	45	43
18	30	9.545843	10.454157	9.574468	10.425532	10.028625	9.971375	30	42
19	45	9.545927	10.454073	9.574564	10.425436	10.028637	9.971363	15	41
20	35	9.546011	10.453989	9.574660	10.425340	10.028649	9.971351	25	40
21	15	9.546095	10.453905	9.574756	10.425244	10.028661	9.971339	45	39
22	30	9.546179	10.453821	9.574852	10.425148	10.028673	9.971327	30	38
23	45	9.546263	10.453737	9.574948	10.425052	10.028685	9.971315	15	37
24	36	9.546347	10.453653	9.575044	10.424956	10.028697	9.971303	24	36
25	15	9.546431	10.453569	9.575140	10.424860	10.028708	9.971292	45	35
26	30	9.546515	10.453485	9.575235	10.424765	10.028720	9.971280	30	34
27	45	9.546599	10.453401	9.575331	10.424669	10.028732	9.971268	15	33
28	37	9.546683	10.453317	9.575427	10.424573	10.028744	9.971256	23	32
29	15	9.546767	10.453233	9.575523	10.424477	10.028756	9.971244	45	31
30	30	9.546851	10.453149	9.575619	10.424381	10.028768	9.971232	30	30
31	45	9.546935	10.453065	9.575715	10.424285	10.028780	9.971220	15	29
32	38	9.547019	10.452981	9.575810	10.424190	10.028792	9.971208	22	28
33	15	9.547103	10.452897	9.575906	10.424094	10.028804	9.971196	45	27
34	30	9.547187	10.452813	9.576002	10.423998	10.028815	9.971185	30	26
35	45	9.547270	10.452730	9.576098	10.423902	10.028827	9.971173	15	25
36	39	9.547354	10.452646	9.576193	10.423807	10.028839	9.971161	21	24
37	15	9.547438	10.452562	9.576289	10.423711	10.028851	9.971149	45	23
38	30	9.547522	10.452478	9.576385	10.423615	10.028863	9.971137	30	22
39	45	9.547605	10.452395	9.576480	10.423520	10.028875	9.971125	15	21
40	40	9.547689	10.452311	9.576576	10.423424	10.028887	9.971113	20	20
41	15	9.547773	10.452227	9.576672	10.423328	10.028899	9.971101	45	19
42	30	9.547857	10.452143	9.576767	10.423233	10.028911	9.971089	30	18
43	45	9.547940	10.452060	9.576863	10.423137	10.028923	9.971077	15	17
44	41	9.548024	10.451976	9.576958	10.423042	10.028935	9.971065	19	16
45	15	9.548108	10.451892	9.577054	10.422946	10.028946	9.971054	45	15
46	30	9.548191	10.451809	9.577150	10.422850	10.028958	9.971042	30	14
47	45	9.548275	10.451725	9.577245	10.422755	10.028970	9.971030	15	13
48	42	9.548358	10.451642	9.577341	10.422659	10.028982	9.971018	18	12
49	15	9.548442	10.451558	9.577436	10.422564	10.028994	9.971006	45	11
50	30	9.548526	10.451474	9.577532	10.422468	10.029006	9.970994	30	10
51	45	9.548609	10.451391	9.577627	10.422373	10.029018	9.970982	15	9
52	43	9.548693	10.451307	9.577723	10.422277	10 029030	9.970970	17	8
53	15	9.548776	10.451224	9.577818	10.422182	10.029042	9.970958	45	7
54	30	9.548860	10.451140	9.577913	10.422087	10.029054	9.970946	30	6
55	45	9.548943	10.451057	9.578009	10.421991	10.029066	9.970934	15	5
56	44	9.549027	10.450973	9.578104	10.421896	10.029078	9.970922	16	4
57	15	9.549110	10.450890	9.578200	10.421800	10.029090	9.970910	45	3
58	30	9.549193	10.450807	9.578295	10.421705	10.029102	9.970898	30	2
59	45	9.549277	10.450723	9.578390	10.421610	10.029114	9.970886	15	1
60	45	9.549360	10.450640	9.578486	10.421514	10.029126	9.970874	15	0
sec	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
4h 37m.		LOG. SINES, &c.						69 deg.	

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
1h 23m.			LOG. SINES, &c.				20 deg.		
0	45	9.549360	10.450640	9.578486	10.421514	10.029126	9.970874	15	60
1	15	9.549443	10.450557	9.578581	10.421419	10.029138	9.970862	45	59
2	30	9.549527	10.450473	9.578676	10.421324	10.029150	9.970850	30	58
3	45	9.549610	10.450390	9.578772	10.421228	10.029162	9.970838	15	57
4	46	9.549693	10.450307	9.578867	10.421133	10.029174	9.970826	14	56
5	15	9.549777	10.450223	9.578962	10.421038	10.029186	9.970814	45	55
6	30	9.549860	10.450140	9.579057	10.420943	10.029197	9.970803	30	54
7	45	9.549943	10.450057	9.579153	10.420847	10.029209	9.970791	15	53
8	47	9.550026	10.449974	9.579248	10.420752	10.029221	9.970779	13	52
9	15	9.550110	10.449890	9.579343	10.420657	10.029233	9.970767	45	51
10	30	9.550193	10.449807	9.579438	10.420562	10.029245	9.970755	30	50
11	45	9.550276	10.449724	9.579533	10.420467	10.029257	9.970743	15	49
12	48	9.550359	10.449641	9.579629	10.420371	10.029269	9.970731	12	48
13	15	9.550442	10.449558	9.579724	10.420276	10.029281	9.970719	45	47
14	30	9.550525	10.449475	9.579819	10.420181	10.029293	9.970707	30	46
15	45	9.550608	10.449392	9.579914	10.420086	10.029305	9.970695	15	45
16	49	9.550692	10.449308	9.580009	10.419991	10.029317	9.970683	11	44
17	15	9.550775	10.449225	9.580104	10.419896	10 029329	9.970671	45	43
18	30	9.550858	10.449142	9.580199	10.419801	10.029341	9.970659	30	42
19	45	9.550941	10.449059	9.580294	10.419706	10.029353	9.970647	15	41
20	50	9.551024	10.448976	9.580389	10.419611	10.029365	9.970635	10	40
21	15	9.551107	10.448893	9.580484	10.419516	10.029377	9.970623	45	39
22	30	9.551190	10.448810	9.580579	10.419421	10.029390	9.970610	30	38
23	45	9.551273	10.448727	9.580674	10.419326	10.029402	9.970598	15	37
24	51	9.551356	10.448644	9.580769	10.419231	10.029414	9.970586	9	36
25	15	9.551438	10.448562	9.580864	10.419136	10.029426	9.970574	45	35
26	30	9.551521	10.448479	9.580959	10.419041	10.029438	9.970562	30	34
27	45	9.551604	10.448396	9.581054	10.418946	10.029450	9.970550	15	33
28	52	9.551687	10.448313	9.581149	10.418851	10.029462	9.970538	8	32
29	15	9.551770	10.448230	9.581244	10.418756	10.029474	9.970526	45	31
30	30	9.551853	10.448147	9.581338	10.418662	10.029486	9.970514	30	30
31	45	9.551936	10.448064	9 581433	10.418567	10.029498	9.970502	15	29
32	53	9.552018	10.447982	9.581528	10.418472	10.029510	9.970490	7	28
33	15	9.552101	10.447899	9 581623	10.418377	10.029522	9.970478	45	27
34	30	9.552184	10.447816	9.581718	10.418282	10.029534	9.970466	30	26
35	45	9.552267	10.447733	9.581813	10.418187	10.029546	9.970454	15	25
36	54	9.552349	10.447651	9.581907	10.418093	10.029558	9.970442	6	24
37	15	9.552432	10.447568	9.582002	10.417998	10.029570	9.970430	45	23
38	30	9.552515	10.447485	9.582097	10.417903	10.029582	9.970418	30	22
39	45	9.552597	10.447403	9.582192	10.417808	10.029594	9.970406	15	21
40	55	9.552680	10.447320	9.582286	10.417714	10.029606	9.970394	5	20
41	15	9.552763	10.447237	9.582381	10.417619	10.029618	9.970382	45	19
42	30	9.552845	10.447155	9.582476	10.417524	10.029631	9.970369	30	18
43	45	9.552928	10.447072	9.582570	10.417430	10.029643	9.970357	15	17
44	56	9.553010	10.446990	9.582665	10.417335	10.029655	9.970345	4	16
45	15	9.553093	10.446907	9.582760	10.417240	10.029667	9.970333	45	15
46	30	9.553175	10.446825	9.582854	10.417146	10.029679	9.970321	30	14
47	45	9 553258	10.446742	9.582949	10.417051	10.029691	9.970309	15	13
48	57	9.553341	10.446659	9.583043	10.416957	10.029703	9.970297	3	12
49	15	9.553423	10.446577	9 583138	10.416862	10.029715	9.970285	45	11
50	30	9.553505	10.446495	9.583233	10.416767	10.029727	9.970273	30	10
51	45	9.553588	10.446412	9.583327	10.416673	10.029739	9.970261	15	9
52	58	9.553670	10.446330	9.583422	10.416578	10.029751	9.970249	2	8
53	15	9.553753	10.446247	9.583516	10.416484	10.029764	9.970236	45	7
54	30	9.553835	10.446165	9.583611	10.416389	10.029776	9.970224	30	6
55	45	9.553918	10.446082	9.583705	10.416295	10.029788	9.970212	15	5
56	59	9.554000	10.446000	9.583800	10.416200	10.029800	9.970200	1	4
57	15	9.554082	10.445918	9.583894	10.416106	10.029812	9.970188	45	3
58	30	9.554165	10.445835	9.583989	10.416011	10.029824	9.970176	30	2
59	45	9.554247	10.445753	9.584083	10.415917	10.029836	9.970164	15	1
60	60	9.554329	10.445671	9.584177	10.415823	10.029848	9.970152	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
4h 36m.			LOG. SINES, &c.				69 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	1h 24m.			LOG. SINES, &c.			21 deg.		
0	0	9.554329	10.445671	9.584177	10.415823	10.029848	9.970152	60	60
1	15	9.554411	10.445589	9.584272	10.415728	10.029860	9.970140	45	59
2	30	9.554494	10.445506	9.584366	10.415634	10.029873	9.970127	30	58
3	45	9.554576	10.445424	9.584461	10.415539	10.029885	9.970115	15	57
4	1	9.554658	10.445342	9.584555	10.415445	10.029897	9.970103	59	56
5	15	9.554740	10.445260	9.584649	10.415351	10.029909	9.970091	45	55
6	30	9.554822	10.445178	9.584743	10.415257	10.029921	9.970079	30	54
7	45	9.554905	10.445095	9.584838	10.415162	10.029933	9.970067	15	53
8	2	9.554987	10.445013	9.584932	10.415068	10.029945	9.970055	58	52
9	15	9.555069	10.444931	9.585026	10.414974	10.029958	9.970042	45	51
10	30	9.555151	10.444849	9.585121	10.414879	10.029970	9.970030	30	50
11	45	9.555233	10.444767	9.585215	10.414785	10.029982	9.970018	15	49
12	3	9.555315	10.444685	9.585309	10.414691	10.029994	9.970006	57	48
13	15	9.555397	10.444603	9.585403	10.414597	10 030006	9.969994	45	47
14	30	9.555479	10.444521	9.585497	10.414503	10.030018	9.969982	30	46
15	45	9.555561	10.444439	9.585592	10.414408	10.030030	9.969970	15	45
16	4	9.555643	10.444357	9.585686	10.414314	10.030043	9.969957	56	44
17	15	9.555725	10.444275	9.585780	10.414220	10.030055	9.969945	45	43
18	30	9.555807	10 444193	9 585874	10.414126	10.030067	9.969933	30	42
19	45	9.555889	10.444111	9.585968	10.414032	10.030079	9.969921	15	41
20	5	9.555971	10.444029	9.586062	10.413938	10.030091	9.969909	55	40
21	15	9.556053	10.443947	9.586156	10.413844	10.030103	9.969897	45	39
22	30	9.556135	10.443865	9.586250	10.413750	10.030116	9.969884	30	38
23	45	9.556217	10.443783	9.586345	10.413655	10.030128	9.969872	15	37
24	6	9.556299	10.443701	9.586439	10.413561	10.030140	9 969860	54	36
25	15	9.556380	10.443620	9.586533	10.413467	10.030152	9.969848	45	35
26	30	9.556462	10.443538	9.586627	10.413373	10.030164	9.969836	30	34
27	45	9.556544	10.443456	9.586721	10.413279	10.030177	9.969823	15	33
28	7	9.556626	10.443374	9.586815	10.413185	10.030189	9.969811	53	32
29	15	9.556708	10.443292	9.586909	10.413091	10.030201	9.969799	45	31
30	30	9.556789	10.443211	9.587003	10.412997	10.030213	9.969787	30	30
31	45	9.556871	10.443129	9.587096	10.412904	10.030225	9.969775	15	29
32	8	9.556953	10.443047	9.587190	10.412810	10.030238	9.969762	52	28
33	15	9.557035	10.442965	9.587284	10.412716	10.030250	9.969750	45	27
34	30	9.557116	10.442884	9.587378	10.412622	10.030262	9.969738	30	26
35	45	9.557198	10.442802	9.587472	10.412528	10.030274	9.969726	15	25
36	9	9.557280	10.442720	9.587566	10.412434	10 030286	9.969714	51	24
37	15	9.557361	10.442639	9.587660	10.412340	10.030299	9.969701	45	23
38	30	9.557443	10.442557	9.587754	10.412246	10.030311	9.969689	30	22
39	45	9.557524	10.442476	9.587847	10.412153	10.030323	9.969677	15	21
40	10	9.557606	10.442394	9.587941	10.412059	10.030335	9.969665	50	20
41	15	9.557687	10.442313	9.588035	10.411965	10.030348	9.969652	45	19
42	30	9.557769	10.442231	9.588129	10.411871	10.030360	9.969640	30	18
43	45	9.557851	10.442149	9.588223	10.411777	10.030372	9.969628	15	17
44	11	9.557932	10.442068	9.588316	10.411684	10.030384	9.969616	49	16
45	15	9.558014	10.441986	9.588410	10.411590	10.030397	9.969603	45	15
46	30	9.558095	10.441905	9.588504	10.411496	10.030409	9.969591	30	14
47	45	9.558176	10.441824	9.588597	10.411403	10.030421	9.969579	15	13
48	12	9.558258	10.441742	9.588691	10.411309	10.030433	9.969567	48	12
49	15	9.558339	10.441661	9.588785	10.411215	10.030446	9.969554	45	11
50	30	9.558421	10.441579	9.588878	10.411122	10.030458	9.969542	30	10
51	45	9.558502	10.441498	9.588972	10.411028	10.030470	9.969530	15	9
52	13	9.558583	10.441417	9.589066	10.410934	10.030482	9.969518	47	8
53	15	9.558665	10.441335	9.589159	10.410841	10.030495	9.969505	45	7
54	30	9.558746	10.441254	9.589253	10.410747	10.030507	9.969493	30	6
55	45	9.558827	10.441173	9.589346	10.410654	10.030519	9.969481	15	5
56	14	9.558909	10.441091	9.589440	10.410560	10.030531	9.969469	46	4
57	15	9.558990	10.441010	9.589534	10.410466	10.030544	9.969456	45	3
58	30	9.559071	10.440929	9.589627	10.410373	10.030556	9.969444	30	2
59	45	9.559152	10.440848	9.589721	10.410279	10.030568	9.969432	15	1
60	15	9.559234	10.440766	9.589814	10.410186	10.030580	9.969420	45	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	4h 35m.			LOG. SINES, &c.			68 deg.		

sec.	1h 25m. ′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	LOG. SINES, &c.							21 deg.	
0	15	9.559234	10.440766	9.589814	10.410186	10.030580	9.969420	45	60
1	15	9.559315	10.440685	9.589908	10.410092	10.030593	9.969407	45	59
2	30	9.559396	10.440604	9.590001	10.409999	10.030605	9.969395	30	58
3	45	9.559477	10.440523	9.590095	10.409905	10.030617	9.969383	15	57
4	16	9.559558	10.440442	9.590188	10.409812	10.030630	9.969370	44	56
5	15	9.559640	10.440360	9.590281	10.409719	10.030642	9.969358	45	55
6	30	9.559721	10.440279	9.590375	10.409625	10.030654	9.969346	30	54
7	45	9.559802	10.440198	9.590468	10.409532	10.030667	9.969333	15	53
8	17	9.559883	10.440117	9.590562	10.409438	10.030679	9 969321	43	52
9	15	9.559964	10.440036	9 590655	10.409345	10.030691	9.969309	45	51
10	30	9.560045	10.439955	9.590748	10.409252	10.030703	9.969297	30	50
11	45	9.560126	10.439874	9.590842	10.409158	10.030716	9.969284	15	49
12	18	9.560207	10.439793	9.590935	10.409065	10.030728	9.969272	42	48
13	15	9.560288	10.439712	9.591028	10.408972	10.030740	9.969260	45	47
14	30	9.560369	10.439631	9.591122	10.408878	10.030753	9.969247	30	46
15	45	9.560450	10.439550	9.591215	10.408785	10.030765	9.969235	15	45
16	19	9.560531	10.439469	9.591308	10.408692	10.030777	9.969223	41	44
17	15	9.560612	10.439388	9 591401	10.408599	10.030790	9.969210	45	43
18	30	9.560693	10.439307	9.591495	10.408505	10.030802	9.969198	30	42
19	45	9.560774	10.439226	9.591588	10.408412	10.030814	9.969186	15	41
20	20	9.560855	10.439145	9.591681	10.408319	10.030827	9.969173	40	40
21	15	9.560935	10.439065	9.591774	10.408226	10.030839	9.969161	45	39
22	30	9.561016	10.438984	9.591867	10.408133	10.030851	9.969149	30	38
23	45	9.561097	10.438903	9.591961	10.408039	10.030864	9.969136	15	37
24	21	9.561178	10.438822	9.592054	10.407946	10.030876	9.969124	39	36
25	15	9.561259	10.438741	9.592147	10.407853	10.030888	9.969112	45	35
26	30	9.561339	10.438661	9.592240	10.407760	10.030901	9.969099	30	34
27	45	9.561420	10.438580	9.592333	10.407667	10.030913	9.969087	15	33
28	22	9.561501	10.438499	9.592426	10.407574	10.030925	9.969075	38	32
29	15	9.561582	10.438418	9.592519	10.407481	10.030938	9.969062	45	31
30	30	9.561662	10.438338	9.592612	10.407388	10.030950	9.969050	30	30
31	45	9.561743	10.438257	9.592705	10.407295	10.030962	9.969038	15	29
32	23	9.561824	10.438176	9.592798	10.407202	10.030975	9.969025	37	28
33	15	9.561904	10.438096	9.592891	10.407109	10.030987	9.969013	45	27
34	30	9.561985	10.438015	9.592985	10.407015	10.031000	9.969000	30	26
35	45	9.562066	10.437934	9.593077	10.406923	10.031012	9.968988	15	25
36	24	9.562146	10.437854	9.593170	10.406830	10.031024	9.968976	36	24
37	15	9.562227	10.437773	9.593263	10.406737	10.031037	9.968963	45	23
38	30	9.562307	10.437693	9.593356	10.406644	10.031049	9.968951	30	22
39	45	9.562388	10.437612	9.593449	10.406551	10.031061	9.968939	15	21
40	25	9.562468	10.437532	9.593542	10.406458	10.031074	9.968926	35	20
41	15	9.562549	10.437451	9.593635	10.406365	10.031086	9.968914	45	19
42	30	9.562629	10.437371	9.593728	10.406272	10.031099	9.968901	30	18
43	45	9.562710	10.437290	9.593821	10.406179	10.031111	9.968889	15	17
44	26	9.562790	10.437210	9.593914	10.406086	10.031123	9.968877	34	16
45	15	9.562871	10.437129	9.594007	10.405993	10.031136	9.968864	45	15
46	30	9.562951	10.437049	9 594099	10.405901	10.031148	9.968852	30	14
47	45	9.563032	10.436968	9.594192	10.405808	10.031161	9.968839	15	13
48	27	9.563112	10.436888	9.594285	10.405715	10.031173	9.968827	33	12
49	15	9.563192	10.436808	9.594378	10.405622	10 031185	9.968815	45	11
50	30	9.563273	10.436727	9.594471	10.405529	10.031198	9.968802	30	10
51	45	9.563353	10.436647	9.594563	10.405437	10.031210	9.968790	15	9
52	28	9.563433	10.436567	9.594656	10.405344	10.031223	9.968777	32	8
53	15	9.563514	10.436486	9.594749	10 405251	10 031235	9.968765	45	7
54	30	9.563594	10.436406	9.594842	10.405158	10 031248	9.968752	30	6
55	45	9.563674	10.436326	9.594934	10.405066	10 031260	9.968740	15	5
56	29	9.563755	10.436245	9.595027	10.404973	10.031272	9.968728	31	4
57	15	9.563835	10.436165	9.595120	10.404880	10.031285	9.968715	45	3
58	30	9.563915	10.436085	9.595212	10.404788	10.031297	9.968703	30	2
59	45	9.563995	10.436005	9.595305	10.404695	10.031310	9.968690	15	1
60	30	9.564075	10.435925	9.595397	10.404603	10.031322	9.968678	30	0
sec.	′ ″	cosine.	secant.	cotangent	tangent.	cosecant.	sine.	″ ′	sec.
	4h 34m.		LOG. SINES, &c.				68 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	$1^h\ 26^m$.		LOG. SINES, &c.				21 deg.		
0	30	9.564075	10.435925	9.595397	10.404603	10.031322	9.968678	30	60
1	15	9.564156	10.435844	9.595490	10.404510	10.031335	9.968665	45	59
2	30	9.564236	10.435764	9.595583	10.404417	10.031347	9.968653	30	58
3	45	9.564316	10.435684	9.595675	10.404325	10.031359	9.968641	15	57
4	31	9.564396	10.435604	9.595768	10·404232	10.031372	9.968628	29	56
5	15	9.564476	10.435524	9.595860	10.404140	10.031384	9.968616	45	55
6	30	9.564556	10.435444	9.595953	10.404047	10.031397	9.968603	30	54
7	45	9.564636	10.435364	9.596045	10.403955	10.031409	9.968591	15	53
8	32	9.564716	10.435284	9.596138	10.403862	10.031422	9.968578	28	52
9	15	9 564796	10.435204	9.596230	10.403770	10.031434	9.968566	45	51
10	30	9.564876	10.435124	9.596323	10.403677	10.031447	9.968553	30	50
11	45	9.564956	10.435044	9.596415	10.403585	10.031459	9.968541	15	49
12	33	9 565036	10.434964	9.596508	10.403492	10.031472	9.968528	27	48
13	15	9.565116	10.434884	9.596600	10.403400	10.031484	9.968516	45	47
14	30	9.565196	10.434804	9.596693	10.403307	10.031497	9.968503	30	46
15	45	9.565276	10.434724	9.596785	10.403215	10.031509	9.968491	15	45
16	34	9.565356	10.434644	9.596878	10.403122	10.031522	9.968478	26	44
17	15	9.565436	10.434564	9.596970	10.403030	10.031534	9.968466	45	43
18	30	9.565516	10.434484	9.597062	10.402938	10.031547	9.968453	30	42
19	45	9.565596	10.434404	9.597155	10.402845	10.031559	9.968441	15	41
20	35	9.565676	10.434324	9.597247	10.402753	10.031571	9.968429	25	40
21	15	9.565755	10.434245	9.597339	10.402661	10.031584	9.968416	45	39
22	30	9.565835	10.434165	9.597432	10.402568	10.031596	9.968404	30	38
23	45	9.565915	10.434085	9.597524	10.402476	10.031609	9.968391	15	37
24	36	9.565995	10.434005	9.597616	10.402384	10.031621	9.968379	24	36
25	15	9.566074	10.433926	9.597708	10.402292	10.031634	9.968366	45	35
26	30	9.566154	10.433846	9.597801	10.402199	10.031647	9.968353	30	34
27	45	9.566234	10.433766	9.597893	10.402107	10.031659	9.968341	15	33
28	37	9.566314	10.433686	9.597985	10.402015	10.031672	9.968328	23	32
29	15	9.566393	10.433607	9.598077	10.401923	10.031684	9.968316	45	31
30	30	9.566473	10.433527	9.598170	10.401830	10.031697	9.968303	30	30
31	45	9.566553	10.433447	9.598262	10.401738	10.031709	9.968291	15	29
32	38	9.566632	10.433368	9.598354	10.401646	10.031722	9.968278	22	28
33	15	9.566712	10.433288	9.598446	10.401554	10.031734	9.968266	45	27
34	30	9.566792	10.433208	9.598538	10.401462	10.031747	9.968253	30	26
35	45	9.566871	10.433129	9.598630	10.401370	10.031759	9.968241	15	25
36	39	9.566951	10.433049	9.598722	10.401278	10.031772	9.968228	21	24
37	15	9.567030	10.432970	9.598815	10.401185	10.031784	9.968216	45	23
38	30	9.567110	10.432890	9.598907	10.401093	10.031797	9.968203	30	22
39	45	9.567189	10.432811	9.598999	10.401001	10.031809	9.968191	15	21
40	40	9.567269	10.432731	9.599091	10.400909	10.031822	9.968178	20	20
41	15	9.567348	10.432652	9.599183	10.400817	10.031834	9.968166	45	19
42	30	9.567428	10.432572	9.599275	10.400725	10.031847	9.968153	30	18
43	45	9.567507	10.432493	9.599367	10.400633	10.031860	9.968140	15	17
44	41	9.567587	10.432413	9.599459	10.400541	10.031872	9.968128	19	16
45	15	9.567666	10.432334	9.599551	10.400449	10.031885	9.968115	45	15
46	30	9.567746	10.432254	9.599643	10.400357	10.031897	9.968103	30	14
47	46	9.567825	10.432175	9.599735	10.400265	10.031910	9.968090	15	13
48	42	9.567904	10.432096	9.599827	10.400173	10.031922	9.968078	18	12
49	15	9.567984	10.432016	9.599919	10.400081	10.031935	9.968065	45	11
50	30	9.568063	10.431937	9.600010	10.399990	10.031948	9.968052	30	10
51	45	9.568142	10.431858	9.600102	10.399898	10.031960	9.968040	15	9
52	43	9.568222	10.431778	9.600194	10.399806	10.031973	9.968027	17	8
53	15	9.568301	10.431699	9.600286	10.399714	10.031985	9.968015	45	7
54	30	9.568380	10.431620	9.600378	10.399622	10.031998	9.968002	30	6
55	45	9.568459	10.431541	9.600470	10.399530	10.032010	9.967990	15	5
56	44	9.568539	10.431461	9.600562	10.399438	10.032023	9.967977	16	4
57	15	9.568618	10.431382	9.600653	10.399347	10.032036	9.967964	45	3
58	30	9.568697	10.431303	9.600745	10.399255	10.032048	9.967952	30	2
59	45	9.568776	10.431224	9.600837	10.399163	10.032061	9.967939	15	1
60	45	9.568855	10.431145	9.600929	10.399071	10.032073	9.967927	15	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$4^h\ 33^m$.		LOG. SINES, &c.				68 deg.		

1h 27m.			LOG. SINES, &c.				21 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine	″ ′	sec.
0	45	9 568855	10.431145	9.600929	10 399071	10.032073	9.967927	15	60
1	15	9.568935	10.431065	9.601021	10.398979	10.032086	9.967914	45	59
2	30	9.569014	10 430986	9.601112	10.398888	10.032099	9.967901	30	58
3	45	9.569093	10 430907	9.601204	10.398796	10.032111	9.967889	15	57
4	46	9.569172	10 430828	9.601296	10.398704	10.032124	9 967876	14	56
5	15	9.569251	10 430749	9.601387	10.398613	10.032136	9.967864	45	55
6	30	9.569330	10 430670	9 601479	10.398521	10.032149	9.967851	30	54
7	45	9.569409	10 430591	9.601571	10.398429	10.032162	9.967838	15	53
8	47	9.569488	10.430512	9 601662	10.398338	10.032174	9.967826	13	52
9	15	9.569567	10 430433	9.601754	10.398246	10.032187	9.967813	45	51
10	30	9.569646	10.430354	9.601846	10.398154	10.032200	9.967800	30	50
11	45	9.569725	10.430275	9.601937	10.398063	10.032212	9.967788	15	49
12	48	9.569804	10.430196	9.602029	10.397971	10.032225	9.967775	12	48
13	15	9.569883	10.430117	9.602121	10.397879	10.032237	9.967763	45	47
14	30	9.569962	10.430038	9.602212	10.397788	10 032250	9.967750	30	46
15	45	9.570041	10.429959	9.602304	10.397696	10.032263	9.967737	15	45
16	49	9.570120	10.429880	9.602395	10.397605	10.032275	9.967725	11	44
17	15	9.570199	10.429801	9.602487	10.397513	10.032288	9 967712	45	43
18	30	9.570278	10.429722	9.602578	10.397422	10.032301	9.967699	30	42
19	45	9.570357	10.429643	9.602670	10.397330	10.032313	9.967687	15	41
20	50	9.570435	10.429565	9.602761	10.397239	10.032326	9.967674	10	40
21	15	9.570514	10.429486	9.602853	10.397147	10.032339	9.967661	45	39
22	30	9.570593	10.429407	9.602944	10.397056	10.032351	9.967649	30	38
23	45	9.570672	10.429328	9.603036	10.396964	10.032364	9.967636	15	37
24	51	9.570751	10.429249	9.603127	10.396873	10.032377	9.967623	9	36
25	15	9.570829	10.429171	9.603219	10.396781	10.032389	9.967611	45	35
26	30	9.570908	10.429092	9.603310	10.396690	10.032402	9.967598	30	34
27	45	9.570987	10.429013	9.603401	10.396599	10.032415	9.967585	15	33
28	52	9.571066	10.428934	9.603493	10.396507	10.032427	9.967573	8	32
29	15	9.571144	10.428856	9.603584	10.396416	10.032440	9.967560	45	31
30	30	9.571223	10.428777	9.603675	10.396325	10.032453	9.967547	30	30
31	45	9.571302	10.428698	9.603767	10.396233	10.032465	9.967535	15	29
32	53	9.571380	10.428620	9.603858	10.396142	10.032478	9.967522	7	28
33	15	9.571459	10.428541	9.603949	10.396051	10.032491	9.967509	45	27
34	30	9.571537	10.428463	9.604041	10.395959	10.032503	9.967497	30	26
35	45	9.571616	10.428384	9.604132	10.395868	10.032516	9.967484	15	25
36	54	9.571695	10.428305	9.604223	10.395777	10.032529	9.967471	6	24
37	15	9.571773	10.428227	9.604314	10.395686	10.032541	9.967459	45	23
38	30	9.571852	10.428148	9.604406	10.395594	10.032554	9.967446	30	22
39	45	9.571930	10.428070	9.604497	10.395503	10.032567	9.967433	15	21
40	55	9.572009	10.427991	9.604588	10.395412	10.032580	9.967420	5	20
41	15	9.572087	10.427913	9.604679	10.395321	10.032592	9.967408	45	19
42	30	9.572166	10.427834	9.604771	10.395229	10.032605	9.967395	30	18
43	45	9.572244	10.427756	9.604862	10.395138	10.032618	9.967382	15	17
44	56	9.572323	10.427677	9.604953	10.395047	10.032630	9.967370	4	16
45	15	9.572401	10.427599	9.605044	10.394956	10.032643	9.967357	45	15
46	30	9.572479	10.427521	9.605135	10.394865	10.032656	9.967344	30	14
47	45	9.572558	10.427442	9.605226	10.394774	10.032669	9.967331	15	13
48	57	9.572636	10.427364	9.605317	10.394683	10.032681	9.967319	3	12
49	15	9.572715	10.427285	9.605408	10.394592	10.032694	9.967306	45	11
50	30	9.572793	10.427207	9.605500	10.394500	10.032707	9.967293	30	10
51	45	9.572871	10.427129	9.605591	10.394409	10.032719	9 967281	15	9
52	58	9.572949	10.427051	9.605682	10.394318	10.032732	9.967268	2	8
53	15	9.573028	10.426972	9.605773	10.394227	10.032745	9.967255	45	7
54	30	9.573106	10.426894	9.605864	10.394136	10.032758	9.967242	30	6
55	45	9.573184	10.426816	9.605955	10.394045	10.032770	9.967230	15	5
56	59	9.573263	10.426737	9 606046	10.393954	10.032783	9.967217	1	4
57	15	9.573341	10.426659	9.606137	10.393863	10.032796	9.967204	45	3
58	30	9 573419	10.426581	9.606228	10.393772	10.032809	9.967191	30	2
59	45	9.573497	10.426503	9.606319	10.393681	10.032821	9.967179	15	1
60	60	9.573575	10.426425	9.606410	10.393590	10.032834	9.967166	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
4h 32m.			LOG. SINES, &c.				68 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	1h 28m.		LOG. SINES, &c.				22 deg.		
0	0	9.573575	10.426425	9.606410	10.393590	10.032834	9.967166	60	60
1	15	9.573654	10.426346	9.606500	10.393500	10.032847	9.967153	45	59
2	30	9.573732	10.426268	9.606591	10.393409	10.032860	9.967140	30	58
3	45	9.573810	10.426190	9.606682	10.393318	10.032872	9.967128	15	57
4	1	9.573888	10.426112	9.606773	10.393227	10.032885	9.967115	59	56
5	15	9.573966	10.426034	9.606864	10.393136	10.032898	9.967102	45	55
6	30	9.574044	10.425956	9.606955	10.393045	10.032911	9.967089	30	54
7	45	9.574122	10.425878	9.607046	10.392954	10.032924	9.967076	15	53
8	2	9.574200	10.425800	9.607137	10.392863	10.032936	9.967064	58	52
9	15	9.574278	10.425722	9.607227	10.392773	10.032949	9.967051	45	51
10	30	9.574356	10.425644	9.607318	10.392682	10.032962	9.967038	30	50
11	45	9.574434	10.425566	9.607409	10.392591	10.032975	9.967025	15	49
12	3	9.574512	10.425488	9.607500	10.392500	10.032988	9.967012	57	48
13	15	9.574590	10.425410	9.607590	10.392410	10.033000	9.967000	45	47
14	30	9.574668	10.425332	9.607681	10.392319	10.033013	9.966987	30	46
15	45	9.574746	10.425254	9.607772	10.392228	10.033026	9.966974	15	45
16	4	9.574824	10.425176	9.607863	10.392137	10.033039	9.966961	56	44
17	15	9.574902	10.425098	9.607953	10.392047	10.033052	9.966948	45	43
18	30	9.574980	10.425020	9.608044	10.391956	10.033064	9.966936	30	42
19	45	9.575058	10.424942	9.608135	10.391865	10.033077	9.966923	15	41
20	5	9.575136	10.424864	9.608225	10.391775	10.033090	9.966910	55	40
21	15	9.575213	10.424787	9.608316	10.391684	10.033103	9.966897	45	39
22	30	9.575291	10.424709	9.608407	10.391593	10.033116	9.966884	30	38
23	45	9.575369	10.424631	9.608497	10.391503	10.033128	9.966872	15	37
24	6	9.575447	10.424553	9.608588	10.391412	10.033141	9.966859	54	36
25	15	9.575525	10.424475	9.608679	10.391321	10.033154	9.966846	45	35
26	30	9.575602	10.424398	9.608769	10.391231	10.033167	9.966833	30	34
27	45	9.575680	10.424320	9.608860	10.391140	10.033180	9.966820	15	33
28	7	9.575758	10.424242	9.608950	10.391050	10.033193	9.966807	53	32
29	15	9.575835	10.424165	9.609041	10.390959	10.033205	9.966795	45	31
30	30	9.575913	10.424087	9.609131	10.390869	10.033218	9.966782	30	30
31	45	9.575991	10.424009	9.609222	10.390778	10.033231	9.966769	15	29
32	8	9.576068	10.423932	9.609312	10.390688	10.033244	9.966756	52	28
33	15	9.576146	10.423854	9.609403	10.390597	10.033257	9.966743	45	27
34	30	9.576224	10.423776	9.609493	10.390507	10.033270	9.966730	30	26
35	45	9.576301	10.423699	9.609584	10.390416	10.033282	9.966718	15	25
36	9	9.576379	10.423621	9.609674	10.390326	10.033295	9.966705	51	24
37	15	9.576457	10.423543	9.609765	10.390235	10.033308	9.966692	45	23
38	30	9.576534	10.423466	9.609855	10.390145	10.033321	9.966679	30	22
39	45	9.576612	10.423388	9.609945	10.390055	10.033334	9.966666	15	21
40	10	9.576689	10.423311	9.610036	10.389964	10.033347	9.966653	50	20
41	15	9.576767	10.423233	9.610126	10.389874	10.033360	9.966640	45	19
42	30	9.576844	10.423156	9.610217	10.389783	10.033372	9.966628	30	18
43	45	9.576922	10.423078	9.610307	10.389693	10.033385	9.966615	15	17
44	11	9.576999	10.423001	9.610397	10.389603	10.033398	9.966602	49	16
45	15	9.577077	10.422923	9.610488	10.389512	10.033411	9.966589	45	15
46	30	9.577154	10.422846	9.610578	10.389422	10.033424	9.966576	30	14
47	45	9.577231	10.422769	9.610668	10.389332	10.033437	9.966563	15	13
48	12	9.577309	10.422691	9.610759	10.389241	10.033450	9.966550	48	12
49	15	9.577386	10.422614	9.610849	10.389151	10.033463	9.966537	45	11
50	30	9.577464	10.422536	9.610939	10.389061	10.033476	9.966524	30	10
51	45	9.577541	10.422459	9.611029	10.388971	10.033488	9.966512	15	9
52	13	9.577618	10.422382	9.611120	10.388880	10.033501	9.966499	47	8
53	15	9.577696	10.422304	9.611210	10.388790	10.033514	9.966486	45	7
54	30	9.577773	10.422227	9.611300	10.388700	10.033527	9.966473	30	6
55	45	9.577850	10.422150	9.611390	10.388610	10.033540	9.966460	15	5
56	14	9.577927	10.422073	9.611480	10.388520	10.033553	9.966447	46	4
57	15	9.578005	10.421995	9.611570	10.388430	10.033566	9.966434	45	3
58	30	9.578082	10.421918	9.611661	10.388339	10.033579	9.966421	30	2
59	45	9.578159	10.421841	9.611751	10.388249	10.033592	9.966408	15	1
60	15	9.578236	10.421764	9.611841	10.388159	10.033606	9.966395	45	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	4h 31 .		LOG. SINES, &c.				67 deg.		

1h 29m.			LOG. SINES, &c.				22 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	15	9.578236	10.421764	9.611841	10.388159	10.033605	9.966395	45	60
1	15	9.578314	10.421686	9.611931	10.388069	10.033618	9.966382	45	59
2	30	9.578391	10.421609	9.612021	10.387979	10.033630	9.966370	30	58
3	45	9.578468	10.421532	9.612111	10.387889	10.033643	9.966357	15	57
4	16	9.578545	10.421455	9.612201	10.387799	10.033656	9.966344	44	56
5	15	9.578622	10.421378	9.612291	10.387709	10.033669	9.966331	45	55
6	30	9.578699	10.421301	9.612381	10.387619	10.033682	9.966318	30	54
7	45	9.578776	10.421224	9.612471	10.387529	10.033695	9.966305	15	53
8	17	9.578853	10.421147	9.612561	10.387439	10.033708	9.966292	43	52
9	15	9.578930	10.421070	9.612651	10.387349	10.033721	9.966279	45	51
10	30	9.579008	10.420992	9.612741	10.387259	10.033734	9.966266	30	50
11	45	9.579085	10.420915	9.612831	10.387169	10.033747	9.966253	15	49
12	18	9.579162	10.420838	9.612921	10.387079	10.033760	9.966240	42	48
13	15	9.579239	10.420761	9.613011	10.386989	10.033773	9.966227	45	47
14	30	9.579316	10.420684	9.613101	10.386899	10.033786	9.966214	30	46
15	45	9.579393	10.420607	9.613191	10.386809	10.033799	9.966201	15	45
16	19	9.579469	10.420531	9.613281	10.386719	10.033812	9.966188	41	44
17	15	9.579546	10.420454	9.613371	10.386629	10.033825	9.966175	45	43
18	30	9.579623	10.420377	9.613461	10.386539	10.033838	9.966162	30	42
19	45	9.579700	10.420300	9.613551	10.386449	10.033851	9.966149	15	41
20	20	9.579777	10.420223	9.613641	10.386359	10.033864	9.966136	40	40
21	15	9.579854	10.420146	9.613730	10.386270	10.033877	9.966123	45	39
22	30	9.579931	10.420069	9.613820	10.386180	10.033890	9.966110	30	38
23	45	9.580008	10.419992	9.613910	10.386090	10.033903	9.966097	15	37
24	21	9.580084	10.419916	9.614000	10.386000	10.033915	9.966085	39	36
25	15	9.580161	10.419839	9.614090	10.385910	10.033928	9.966072	45	35
26	30	9.580238	10.419762	9.614180	10.385820	10.033941	9.966059	30	34
27	45	9.580315	10.419685	9.614269	10.385731	10.033954	9.966046	15	33
28	22	9.580392	10.419608	9.614359	10.385641	10.033967	9.966033	38	32
29	15	9.580468	10.419532	9.614449	10.385551	10.033980	9.966020	45	31
30	30	9.580545	10.419455	9.614539	10.385461	10.033993	9.966007	30	30
31	45	9.580622	10.419378	9.614628	10.385372	10.034006	9.965994	15	29
32	23	9.580699	10.419301	9.614718	10.385282	10.034019	9.965981	37	28
33	15	9.580775	10.419225	9.614808	10.385192	10.034032	9.965968	45	27
34	30	9.580852	10.419148	9.614897	10.385103	10.034045	9.965955	30	26
35	45	9.580929	10.419071	9.614987	10.385013	10.034058	9.965942	15	25
36	24	9.581005	10.418995	9.615077	10.384923	10.034072	9.965928	36	24
37	15	9.581082	10.418918	9 615166	10.384834	10.034085	9.965915	45	23
38	30	9.581158	10 418842	9.615256	10.384744	10.034098	9.965902	30	22
39	45	9 581235	10.418765	9.615345	10.384655	10.034111	9.965889	15	21
40	25	9.581312	10.418688	9.615435	10.384565	10.034124	9.965876	35	20
41	15	9.581388	10.418612	9.615525	10.384475	10.034137	9.965863	45	19
42	30	9.581465	10.418535	9.615614	10.384386	10.034150	9.965850	30	18
43	45	9.581541	10.418459	9.615704	10.384296	10.034163	9.965837	15	17
44	26	9.581618	10.418382	9.615793	10.384207	10.034176	9.965824	34	16
45	15	9.581694	10.418306	9.615883	10.384117	10.034189	9.965811	45	15
46	30	9.581771	10.418229	9.615972	10.384028	10.034202	9.965798	30	14
47	45	9.581847	10.418153	9.616062	10.383938	10.034215	9.965785	15	13
48	27	9.581924	10.418076	9.616151	10.383849	10.034228	9.965772	33	12
49	15	9.582000	10.418000	9.616241	10.383759	10.034241	9.965759	45	11
50	30	9.582076	10.417924	9.616330	10.383670	10.034254	9.965746	30	10
51	45	9.582153	10.417847	9.616420	10.383580	10.034267	9.965733	15	9
52	28	9.582229	10.417771	9.616509	10.383491	10.034280	9.965720	32	8
53	15	9.582305	10.417695	9.616599	10.383401	10.034293	9.965707	45	7
54	30	9 582382	10.417618	9 616688	10.383312	10.034306	9.965694	30	6
55	45	9.582458	10.417542	9.616777	10.383223	10.034319	9.965681	15	5
56	29	9.582534	10.417466	9.616867	10.383133	10.034332	9.965668	31	4
57	15	9.582611	10.417389	9.616956	10.383044	10.034345	9.965655	45	3
58	30	9.582687	10.417313	9.617046	10.382954	10.034359	9.965641	30	2
59	45	9.582763	10.417237	9.617135	10.382865	10.034372	9.965628	15	1
60	30	9.582840	10.417160	9.617224	10.382776	10.034385	9.965615	30	0
s..	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
4h 30m.			LOG. SINES, &c.				67 deg.		

1h 30m.			LOG. SINES, &c.				22 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	30	9.582840	10.417160	9.617224	10.382776	10.034385	9.965615	30	60
1	15	9.582916	10.417084	9.617314	10.382686	10.034398	9.965602	45	59
2	30	9.582992	10.417008	9.617403	10.382597	10.034411	9.965589	30	58
3	45	9.583068	10.416932	9.617492	10.382508	10.034424	9.965576	15	57
4	31	9.583144	10.416856	9.617581	10.382419	10.034437	9.965563	29	56
5	15	9.583221	10.416779	9.617671	10.382329	10.034450	9.965550	45	55
6	30	9.583297	10.416703	9.617760	10.382240	10.034463	9.965537	30	54
7	45	9.583373	10.416627	9.617849	10.382151	10.034476	9.965524	15	53
8	32	9.583449	10.416551	9.617938	10.382062	10.034489	9.965511	28	52
9	15	9.583525	10.416475	9.618028	10.381972	10.034503	9.965497	45	51
10	30	9.583601	10.416399	9.618117	10.381883	10.034516	9.965484	30	50
11	45	9.583677	10.416323	9.618206	10.381794	10.034529	9.965471	15	49
12	33	9.583753	10.416247	9.618295	10.381705	10.034542	9.965458	27	48
13	15	9.583830	10.416170	9.618384	10.381616	10.034555	9.965445	45	47
14	30	9.583906	10.416094	9.618474	10.381526	10.034568	9.965432	30	46
15	45	9.583982	10.416018	9.618563	10.381437	10.034581	9.965419	15	45
16	34	9.584058	10.415942	9.618652	10.381348	10.034594	9.965406	26	44
17	15	9.584134	10.415866	9.618741	10.381259	10.034607	9.965393	45	43
18	30	9.584210	10.415790	9.618830	10.381170	10.034621	9.965379	30	42
19	45	9.584285	10.415715	9.618919	10.381081	10.034634	9.965366	15	41
20	35	9.584361	10.415639	9.619008	10.380992	10.034647	9.965353	25	40
21	15	9.584437	10.415563	9.619097	10.380903	10.034660	9.965340	45	39
22	30	9.584513	10.415487	9.619186	10.380814	10.034673	9.965327	30	38
23	45	9.584589	10.415411	9.619275	10.380725	10.034686	9.965314	15	37
24	36	9.584665	10.415335	9.619364	10.380636	10.034699	9.965301	24	36
25	15	9.584741	10.415259	9.619453	10.380547	10.034713	9.965287	45	35
26	30	9.584817	10.415183	9.619542	10.380458	10.034726	9.965274	30	34
27	45	9.584893	10.415107	9.619631	10.380369	10.034739	9.965261	15	33
28	37	9.584968	10.415032	9.619720	10.380280	10.034752	9.965248	23	32
29	15	9.585044	10.414956	9.619809	10.380191	10.034765	9.965235	45	31
30	30	9.585120	10.414880	9.619898	10.380102	10.034778	9.965222	30	30
31	45	9.585196	10.414804	9.619987	10.380013	10.034792	9.965208	15	29
32	38	9.585272	10.414728	9.620076	10.379924	10.034805	9.965195	22	28
33	15	9.585347	10.414653	9.620165	10.379835	10.034818	9.965182	45	27
34	30	9.585423	10.414577	9.620254	10.379746	10.034831	9.965169	30	26
35	45	9.585499	10.414501	9.620343	10.379657	10.034844	9.965156	15	25
36	39	9.585574	10.414426	9.620432	10.379568	10.034857	9.965143	21	24
37	15	9.585650	10.414350	9.620521	10.379479	10.034871	9.965129	45	23
38	30	9.585726	10.414274	9.620609	10.379391	10.034884	9.965116	30	22
39	45	9.585801	10.414199	9.620698	10.379302	10.034897	9.965103	15	21
40	40	9.585877	10.414123	9.620787	10.379213	10.034910	9.965090	20	20
41	15	9.585953	10.414047	9.620876	10.379124	10.034923	9.965077	45	19
42	30	9.586028	10.413972	9.620965	10.379035	10.034937	9.965063	30	18
43	45	9.586104	10.413896	9.621054	10.378946	10.034950	9.965050	15	17
44	41	9.586179	10.413821	9.621142	10.378858	10.034963	9.965037	19	16
45	15	9.586255	10.413745	9.621231	10.378769	10.034976	9.965024	45	15
46	30	9.586330	10.413670	9.621320	10.378680	10.034989	9.965011	30	14
47	45	9.586406	10.413594	9.621409	10.378591	10.035003	9.964997	15	13
48	42	9.586482	10.413518	9.621497	10.378503	10.035016	9.964984	18	12
49	15	9.586557	10.413443	9.621586	10.378414	10.035029	9.964971	45	11
50	30	9.586632	10.413368	9.621675	10.378325	10.035042	9.964958	30	10
51	45	9.586708	10.413292	9.621763	10.378237	10.035055	9.964945	15	9
52	43	9.586783	10.413217	9.621852	10.378148	10.035069	9.964931	17	8
53	15	9.586859	10.413141	9.621941	10.378059	10.035082	9.964918	45	7
54	30	9.586934	10.413066	9.622029	10.377971	10.035095	9.964905	30	6
55	45	9.587010	10.412990	9.622118	10.377882	10.035108	9.964892	15	5
56	44	9.587085	10.412915	9.622207	10.377793	10.035122	9.964878	16	4
57	15	9.587160	10.412840	9.622295	10.377705	10.035135	9.964865	45	3
58	30	9.587236	10.412764	9.622384	10.377616	10.035148	9.964852	30	2
59	45	9.587311	10.412689	9.622472	10.377528	10.035161	9.964839	15	1
60	45	9.587386	10.412614	9.622561	10.377439	10.035174	9.964826	15	0
sec.	′ ″	cosine.	secant.	cotangent	tangent.	cosecant.	sine.	″ ′	sec.
4h 29m.			LOG. SINES, &c.				67 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	1h 31m.		LOG. SINES, &c.				22 deg.		
0	45	9.587386	10.412614	9.622561	10.377439	10.035174	9.964826	15	60
1	15	9.587462	10.412538	9.622649	10.377351	10.035188	9.964812	45	59
2	30	9.587537	10.412463	9.622738	10.377262	10.035201	9.964799	30	58
3	45	9.587612	10.412388	9.622826	10.377174	10.035214	9.964786	15	57
4	46	9.587688	10.412312	9.622915	10.377085	10.035227	9.964773	14	56
5	15	9.587763	10.412237	9.623003	10.376997	10.035241	9.964759	45	55
6	30	9.587838	10.412162	9.623092	10.376908	10.035254	9.964746	30	54
7	45	9.587913	10.412087	9.623180	10.376820	10.035267	9.964733	15	53
8	47	9.587988	10.412012	9.623269	10.376731	10.035281	9.964719	13	52
9	15	9.588064	10.411936	9.623357	10.376643	10.035294	9.964706	45	51
10	30	9.588139	10.411861	9.623446	10.376554	10.035307	9.964693	30	50
11	45	9.588214	10.411786	9.623534	10.376466	10.035320	9.964680	15	49
12	48	9.588289	10.411711	9.623623	10.376377	10.035334	9.964666	12	48
13	15	9.588364	10.411636	9.623711	10.376289	10.035347	9.964653	45	47
14	30	9.588439	10.411561	9.623799	10.376201	10.035360	9.964640	30	46
15	45	9.588514	10.411486	9.623888	10.376112	10.035373	9.964627	15	45
16	49	9.588590	10.411410	9.623976	10.376024	10.035387	9.964613	11	44
17	15	9.588665	10.411335	9.624065	10.375935	10.035400	9.964600	45	43
18	30	9.588740	10.411260	9.624153	10.375847	10.035413	9.964587	30	42
19	45	9.588815	10.411185	9.624241	10.375759	10.035427	9.964573	15	41
20	50	9.588890	10.411110	9.624330	10.375670	10.035440	9.964560	10	40
21	15	9.588965	10.411035	9.624418	10.375582	10.035453	9.964547	45	39
22	30	9.589040	10.410960	9.624506	10.375494	10.035466	9.964534	30	38
23	45	9.589115	10.410885	9.624594	10.375406	10.035480	9.964520	15	37
24	51	9.589190	10.410810	9.624683	10.375317	10.035493	9.964507	9	36
25	15	9.589265	10.410735	9.624771	10.375229	10.035506	9.964494	45	35
26	30	9.589339	10.410661	9.624859	10.375141	10.035520	9.964480	30	34
27	45	9.589414	10.410586	9.624947	10.375053	10.035533	9.964467	15	33
28	52	9.589489	10.410511	9.625036	10.374964	10.035546	9.964454	8	32
29	15	9.589564	10.410436	9.625124	10.374876	10.035560	9.964440	45	31
30	30	9.589639	10.410361	9.625212	10.374788	10.035573	9.964427	30	30
31	45	9.589714	10.410286	9 625300	10.374700	10.035586	9.964414	15	29
32	53	9.589789	10.410211	9.625388	10.374612	10.035600	9.964400	7	28
33	15	9.589864	10.410136	9.625476	10.374524	10.035613	9.964387	45	27
34	30	9.589938	10.410062	9 625565	10.374435	10.035626	9.964374	30	26
35	45	9.590013	10.409987	9.625653	10.374347	10.035640	9.964360	15	25
36	54	9.590088	10.409912	9.625741	10.374259	10.035653	9.964347	6	24
37	15	9.590163	10.409837	9.625829	10.374171	10.035666	9.964334	45	23
38	30	9.590237	10.409763	9.625917	10.374083	10.035680	9.964320	30	22
39	45	9.590312	10.409688	9.626005	10.373995	10.035693	9.964307	15	21
40	55	9.590387	10.409613	9.626093	10.373907	10.035706	9.964294	5	20
41	15	9.590462	10.409538	9.626181	10.373819	10.035720	9.964280	45	19
42	30	9.590536	10.409464	9.626269	10.373731	10.035733	9.964267	30	18
43	45	9.590611	10.409389	9.626357	10.373643	10.035746	9.964254	15	17
44	56	9.590686	10.409314	9.626445	10.373555	10.035760	9.964240	4	16
45	15	9.590760	10.409240	9.626533	10.373467	10.035773	9.964227	45	15
46	30	9.590835	10.409165	9.626621	10.373379	10.035787	9.964213	30	14
47	45	9.590909	10.409091	9.626709	10.373291	10.035800	9.964200	15	13
48	57	9.590984	10.409016	9.626797	10.373203	10.035813	9.964187	3	12
49	15	9.591059	10.408941	9.626885	10.373115	10.035827	9.964173	45	11
50	30	9.591133	10.408867	9.626973	10.373027	10.035840	9.964160	30	10
51	45	9.591208	10.408792	9.627061	10.372939	10.035853	9.964147	15	9
52	58	9.591282	10.408718	9.627149	10.372851	10.035867	9.964133	2	8
53	15	9.591357	10.408643	9.627237	10.372763	10.035880	9.964120	45	7
54	30	9.591431	10.408569	9.627325	10.372675	10.035894	9.964106	30	6
55	45	9.591506	10.408494	9.627413	10.372587	10.035907	9.964093	15	5
56	59	9.591580	10.408420	9.627501	10.372499	10.035920	9.964080	1	4
57	15	9.591655	10.408345	9.627588	10.372412	10.035934	9.964066	45	3
58	30	9.591729	10.408271	9.627676	10.372324	10.035947	9.964053	30	2
59	45	9.591804	10.408196	9.627764	10.372236	10.035961	9.964039	15	1
60	60	9.591878	10.408122	9.627852	10.372148	10.035974	9.964026	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	4h 28m.		LOG. SINES, &c.				67 deg.		

1h 32m.			LOG. SINES, &c.				23 deg.		
sec.	′ ″	sine.	cosecant.	tang-nt.	cotangent.	secant.	cosine.	″ ′	″
0	0	9.591878	10.408122	9.627852	10.372148	10.035974	9.964026	60	60
1	15	9.591952	10.408048	9.627940	10.372060	10.035987	9.964013	45	59
2	30	9.592027	10 407973	9.628027	10.371973	10.036001	9.963999	30	58
3	45	9.592101	10.407899	9.628115	10.371885	10.036014	9.963986	15	57
4	1	9.592175	10.407825	9.628203	10.371797	10.036028	9.963972	59	56
5	15	9.592250	10.407750	9.628291	10.371709	10.036041	9.963959	45	55
6	30	9.592324	10.407676	9.628379	10.371621	10.036054	9.963946	30	54
7	45	9.592398	10.407602	9 628466	10.371534	10.036068	9.963932	15	53
8	2	9.592473	10.407527	9.628554	10 371446	10.036081	9.963919	58	52
9	15	9.592547	10.407453	9.628642	10.371358	10.036095	9.963905	45	51
10	30	9.592621	10.407379	9.628729	10.371271	10.036108	9.963892	30	50
11	45	9.592696	10.407304	9.628817	10.371183	10.036122	9.963878	15	49
12	3	9.592770	10.407230	9.628905	10.371095	10.036135	9.963865	57	48
13	15	9.592844	10.407156	9.628992	10.371008	10.036148	9.963852	45	47
14	30	9.592918	10.407082	9.629080	10.370920	10 036162	9.963838	30	46
15	45	9.592992	10.407008	9.629168	10.370832	10.036175	9.963825	15	45
16	4	9.593067	10.406933	9.629255	10.370745	10.036189	9.963811	56	44
17	15	9.593141	10.406859	9.629343	10.370657	10.036202	9.963798	45	43
18	30	9.593215	10.406785	9.629430	10.370570	10.036216	9.963784	30	42
19	45	9.593289	10.406711	9.629518	10.370482	10.036229	9.963771	15	41
20	5	9.593363	10.406637	9.629606	10.370394	10.036243	9.963757	55	40
21	15	9.593437	10.406563	9.629693	10.370307	10.036256	9.963744	45	39
22	30	9.593511	10.406489	9.629781	10.370219	10.036270	9.963730	30	38
23	45	9.593585	10.406415	9.629868	10.370132	10.036283	9.963717	15	37
24	6	9.593659	10.406341	9.629956	10.370044	10.036296	9.963704	54	36
25	15	9.593733	10.406267	9.630043	10.369957	10.036310	9.963690	45	35
26	30	9.593807	10 406193	9.630131	10.369869	10.036323	9.963677	30	34
27	45	9.593881	10.406119	9.630218	10.369782	10.036337	9.963663	15	33
28	7	9.593955	10.406045	9 630306	10.369694	10.036350	9.963650	53	32
29	15	9.594029	10.405971	9.630393	10.369607	10.036364	9.963636	45	31
30	30	9.594103	10.405897	9.630481	10.369519	10.036377	9.963623	30	30
31	45	9.594177	10.405823	9.630568	10.369432	10.036391	9.963609	15	29
32	8	9.594251	10.405749	9.630656	10.369344	10.036404	9.963596	52	28
33	15	9.594325	10.405675	9 630743	10.369257	10.036418	9.963582	45	27
34	30	9.594399	10.405601	9.630830	10.369170	10.036431	9.963569	30	26
35	45	9.594473	10.405527	9.630918	10.369082	10.036445	9.963555	15	25
36	9	9.594547	10.405453	9.631005	10.368995	10.036458	9.963542	51	24
37	15	9.594621	10.405379	9.631092	10.368908	10.036472	9.963528	45	23
38	30	9.594695	10.405305	9.631180	10.368820	10.036485	9.963515	30	22
39	45	9.594768	10.405232	9.631267	10.368733	10.036499	9.963501	15	21
40	10	9.594842	10.405158	9.631354	10.368646	10.036512	9.963488	50	20
41	15	9.594916	10.405084	9.631442	10.368558	10.036526	9.963474	45	19
42	30	9.594990	10 405010	9 631529	10.368471	10.036539	9.963461	30	18
43	45	9.595064	10.404936	9.631616	10.368384	10.036553	9.963447	15	17
44	11	9.595137	10.404863	9.631704	10.368296	10.036566	9.963434	49	16
45	15	9.595211	10.404789	9.631791	10.368209	10 036580	9.963420	45	15
46	30	9.595285	10.404715	9.631878	10.368122	10.036594	9.963406	30	14
47	45	9.595358	10.404642	9.631965	10.368035	10.036607	9.963393	15	13
48	12	9.595432	10.404568	9.632053	10.367947	10.036621	9.963379	48	12
49	15	9.595506	10.404494	9.632140	10.367860	10.036634	9.963366	45	11
50	30	9.595579	10.404421	9.632227	10.367773	10.036648	9.963352	30	10
51	45	9 595653	10.404347	9.632314	10.367686	10.036661	9.963339	15	9
52	13	9.595727	10.404273	9.632401	10.367599	10.036675	9.963325	47	8
53	15	9 595800	10.404200	9.632489	10.367511	10 036688	9.963312	45	7
54	30	9.595874	10.404126	9.632576	10.367424	10.036702	9.963298	30	6
55	45	9.595948	10.404052	9.632663	10.367337	10.036715	9.963285	15	5
56	14	9.596021	10.403979	9.632750	10.367250	10.036729	9.963271	46	4
57	15	9.596095	10.403905	9.632837	10.367163	10.036743	9.963257	45	3
58	30	9.596168	10.403832	9.632924	10.367076	10.036756	9.963244	30	2
59	45	9.596242	10.403758	9.633011	10.366989	10.036770	9.963230	15	1
60	15	9.596315	10.403685	9.633098	10.366902	10.036783	9.963217	45	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
4h 27m.			LOG. SINES, &c.				66 deg.		

sec.	′ ″	sine	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	1h 33m.		LOG. SINES, &c.				23 deg.		
0	15	9.596315	10.403685	9.633098	10.366902	10.036783	9.963217	45	60
1	15	9.596389	10.403611	9.633186	10.366814	10.036797	9.963203	45	59
2	30	9.596462	10.403538	9.633273	10.366727	10.036810	9.963190	30	58
3	45	9.596536	10.403464	9.633360	10.366640	10.036824	9.963176	15	57
4	16	9.596609	10.403391	9.633447	10.366553	10.036838	9.963162	44	56
5	15	9.596683	10.403317	9.633534	10.366466	10.036851	9.963149	45	55
6	30	9.596756	10.403244	9.633621	10.366379	10.036865	9.963135	30	54
7	45	9.596830	10.403170	9.633708	10.366292	10.036878	9.963122	15	53
8	17	9.596903	10.403097	9.633795	10.366205	10.036892	9.963108	43	52
9	15	9.596976	10.403024	9.633882	10.366118	10 036905	9.963095	45	51
10	30	9.597050	10.402950	9.633969	10.366031	10.036919	9.963081	30	50
11	45	9.597123	10.402877	9.634056	10.365944	10.036933	9.963067	15	49
12	18	9.597196	10.402804	9.634143	10.365857	10.036946	9.963054	42	48
13	15	9.597270	10.402730	9.634230	10.365770	10.036960	9.963040	45	47
14	30	9.597343	10.402657	9 634316	10.365684	10.036973	9.963027	30	46
15	45	9.597416	10.402584	9.634403	10.365597	10.036987	9.963013	15	45
16	19	9.597490	10.402510	9.634490	10.365510	10.037001	9.962999	41	44
17	15	9.597563	10.402437	9.634577	10.365423	10.037014	9.962986	45	43
18	30	9.597636	10.402364	9.634664	10.365336	10.037028	9.962972	30	42
19	45	9.597709	10.402291	9.634751	10.365249	10.037042	9.962958	15	41
20	20	9.597783	10.402217	9.634838	10.365162	10.037055	9 962945	40	40
21	15	9.597856	10.402144	9.634925	10.365075	10.037069	9.962931	45	39
22	30	9.597929	10.402071	9.635011	10 364989	10.037082	9.962918	30	38
23	45	9.598002	10.401998	9.635098	10.364902	10.037096	9.962904	15	37
24	21	9 598075	10.401925	9.635185	10.364815	10.037110	9.962890	39	36
25	15	9.598149	10.401851	9.635272	10.364728	10.037123	9.962877	45	35
26	30	9.598222	10.401778	9.635359	10.364641	10.037137	9.962863	30	34
27	45	9.598295	10.401705	9.635445	10.364555	10.037151	9 962849	15	33
28	22	9 598368	10.401632	9.635532	10.364468	10.037164	9.962836	38	32
29	15	9.598441	10.401559	9.635619	10.364381	10.037178	9.962822	45	31
30	30	9.598514	10.401486	9.635706	10.364294	10.037192	9.962808	30	30
31	45	9.598587	10.401413	9.635792	10 364208	10.037205	9.962795	15	29
32	23	9.598660	10.401340	9.635879	10.364121	10.037219	9.962781	37	28
33	15	9.598733	10.401267	9.635966	10.364034	10.037232	9.962768	45	27
34	30	9.598806	10.401194	9 636052	10.363948	10.037246	9.962754	30	26
35	45	9.598879	10.401121	9.636139	10 363861	10.037260	9.962740	15	25
36	24	9.598952	10.401048	9.636226	10.363774	10.037273	9.962727	36	24
37	15	9.599025	10.400975	9.636312	10.363688	10.037287	9.962713	45	23
38	30	9.599098	10.400902	9.636399	10.363601	10.037301	9.962699	30	22
39	45	9.599171	10.400829	9.636486	10.363514	10.037314	9.962686	15	21
40	25	9.599244	10.400756	9.636572	10.363428	10.037328	9.962672	35	20
41	15	9.599317	10.400683	9.636659	10.363341	10.037342	9.962658	45	19
42	30	9.599390	10.400610	9.636745	10.363255	10.037356	9.962644	30	18
43	45	9.599463	10.400537	9.636832	10.363168	10.037369	9.962631	15	17
44	26	9.599536	10.400464	9.636918	10.363082	10.037383	9.962617	34	16
45	15	9.599608	10.400392	9.637005	10.362995	10.037397	9.962603	45	15
46	30	9.599681	10.400319	9.637092	10.362908	10.037410	9.962590	30	14
47	45	9.599754	10.400246	9.637178	10.362822	10.037424	9.962576	15	13
48	27	9.599827	10.400173	9.637265	10.362735	10.037438	9.962562	33	12
49	15	9.599900	10.400100	9.637351	10.362649	10.037451	9.962549	45	11
50	30	9.599973	10.400027	9.637438	10.362562	10.037465	9.962535	30	10
51	45	9.600045	10 399955	9.637524	10.362476	10.037479	9.962521	15	9
52	28	9.600118	10 399882	9.637611	10.362389	10.037492	9.962508	32	8
53	15	9.600191	10.399809	9.637697	10.362303	10.037506	9.962494	45	7
54	30	9.600264	10.399736	9.637783	10 362217	10.037520	9.962480	30	6
55	45	9.600336	10.399664	9.637870	10.362130	10.037534	9.962466	15	5
56	29	9.600409	10.399591	9.637956	10.362044	10.037547	9.962453	31	4
57	15	9.600482	10.399518	9.638043	10.361957	10.037561	9.962439	45	3
58	30	9.600554	10.399446	9.638129	10.361871	10.037575	9.962425	30	2
59	45	9.600627	10.399373	9.638215	10.361785	10.037589	9.962411	15	1
60	30	9.600700	10.399300	9.638302	10.361698	10.037602	9.962398	30	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	4h 26m.		LOG. SINES, &c.				66 deg.		

1h 34m.				LOG. SINES, &c.			23 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant	cosine.	″ ′	sec.
0	30	9.600700	10.399300	9.638302	10.361698	10.037602	9.962398	30	60
1	15	9.600772	10.399228	9.638388	10.361612	10.037616	9.962384	45	59
2	30	9.600845	10.399155	9.638475	10.361525	10.037630	9.962370	30	58
3	45	9.600917	10.399083	9.638561	10.361439	10.037643	9.962357	15	57
4	31	9.600990	10.399010	9.638647	10.361353	10.037657	9.962343	29	56
5	15	9.601063	10.398937	9.638734	10.361266	10.037671	9.962329	45	55
6	30	9.601135	10.398865	9.638820	10.361180	10.037685	9.962315	30	54
7	45	9.601208	10.398792	9.638906	10.361094	10.037698	9.962302	15	53
8	32	9.601280	10.398720	9.638992	10.361008	10.037712	9.962288	28	52
9	15	9.601353	10.398647	9.639079	10.360921	10.037726	9.962274	45	51
10	30	9.601425	10.398575	9.639165	10.360835	10.037740	9.962260	30	50
11	45	9.601498	10.398502	9.639251	10.360749	10.037753	9.962247	15	49
12	33	9.601570	10.398430	9.639337	10.360663	10.037767	9.962233	27	48
13	15	9.601643	10.398357	9.639424	10.360576	10.037781	9.962219	45	47
14	30	9.601715	10.398285	9.639510	10.360490	10.037795	9.962205	30	46
15	45	9.601788	10.398212	9.639596	10.360404	10.037809	9.962191	15	45
16	34	9.601860	10.398140	9.639682	10.360318	10.037822	9.962178	26	44
17	15	9.601932	10.398068	9.639768	10.360232	10.037836	9.962164	45	43
18	30	9.602005	10.397995	9.639855	10.360145	10.037850	9.962150	30	42
19	45	9.602077	10.397923	9.639941	10.360059	10.037864	9.962136	15	41
20	35	9.602149	10.397851	9.640027	10.359973	10.037877	9.962123	25	40
21	15	9.602222	10.397778	9.640113	10.359887	10.037891	9.962109	45	39
22	30	9.602294	10.397706	9.640199	10.359801	10.037905	9.962095	30	38
23	45	9.602366	10.397634	9.640285	10.359715	10.037919	9.962081	15	37
24	36	9.602439	10.397561	9.640371	10.359629	10.037933	9.962067	24	36
25	15	9.602511	10.397489	9.640457	10.359543	10.037946	9.962054	45	35
26	30	9.602583	10.397417	9.640543	10.359457	10.037960	9.962040	30	34
27	45	9.602656	10.397344	9.640630	10.359370	10.037974	9.962026	15	33
28	37	9.602728	10.397272	9.640716	10.359284	10.037988	9.962012	23	32
29	15	9.602800	10.397200	9.640802	10.359198	10.038002	9.961998	45	31
30	30	9.602872	10.397128	9.640888	10.359112	10.038015	9.961985	30	30
31	45	9.602944	10.397056	9.640974	10.359026	10.038029	9.961971	15	29
32	38	9.603017	10.396983	9.641060	10.358940	10.038043	9.961957	22	28
33	15	9.603089	10.396911	9.641146	10.358854	10.038057	9.961943	45	27
34	30	9.603161	10.396839	9.641232	10.358768	10.038071	9.961929	30	26
35	45	9.603233	10.396767	9.641318	10.358682	10.038085	9.961915	15	25
36	39	9.603305	10.396695	9.641404	10.358596	10.038098	9.961902	21	24
37	15	9.603377	10.396623	9.641489	10.358511	10.038112	9.961888	45	23
38	30	9.603449	10.396551	9.641575	10.358425	10.038126	9.961874	30	22
39	45	9.603521	10.396479	9.641661	10.358339	10.038140	9.961860	15	21
40	40	9.603594	10.396406	9.641747	10.358253	10.038154	9.961846	20	20
41	15	9.603666	10.396334	9.641833	10.358167	10.038168	9.961832	45	19
42	30	9 603738	10.396262	9.641919	10.358081	10.038181	9.961819	30	18
43	45	9.603810	10.396190	9.642005	10.357995	10.038195	9.961805	15	17
44	41	9.603882	10.396118	9.642091	10.357909	10.038209	9.961791	19	16
45	15	9.603954	10.396046	9.642177	10.357823	10.038223	9.961777	45	15
46	30	9 604026	10.395974	9.642262	10.357738	10.038237	9.961763	30	14
47	45	9.604098	10.395902	9.642348	10.357652	10.038251	9.961749	15	13
48	42	9.604170	10.395830	9.642434	10.357566	10.038265	9.961735	18	12
49	15	9.604242	10.395758	9.642520	10.357480	10.038278	9.961722	45	11
50	30	9.604313	10.395687	9.642606	10.357394	10.038292	9.961708	30	10
51	45	9.604385	10.395615	9.642691	10.357309	10.038306	9.961694	15	9
52	43	9.604457	10.395543	9.642777	10.357223	10.038320	9.961680	17	8
53	15	9.604529	10.395471	9.642863	10.357137	10 038334	9.961666	45	7
54	30	9.604601	10.395399	9.642949	10.357051	10.038348	9.961652	30	6
55	45	9.604673	10.395327	9.643035	10.356965	10.038362	9.961638	15	5
56	44	9.604745	10.395255	9.643120	10.356880	10.038376	9.961624	16	4
57	15	9.604817	10.395183	9.643206	10.356794	10.038389	9.961611	45	3
58	30	9.604888	10.395112	9.643292	10.356708	10.038403	9.961597	30	2
59	45	9.604960	10.395040	9.643377	10.356623	10.038417	9.961583	15	1
60	45	9.605032	10.394968	9.643463	10.356537	10.038431	9.961569	15	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
4h 25m.				LOG. SINES, &c.			66 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	′ ″	sec.
	1h 35m.		LOG. SINES, &c.				23 deg.		
0	45	9.605032	10.394968	9.643463	10.356537	10.038431	9.961569	15	60
1	15	9.605104	10.394896	9.643549	10.356451	10.038445	9.961555	45	59
2	30	9.605175	10.394825	9.643634	10.356366	10.038459	9.961541	30	58
3	45	9.605247	10.394753	9.643720	10.356280	10.038473	9.961527	15	57
4	46	9.605319	10.394681	9.643806	10.356194	10.038487	9.961513	14	56
5	15	9.605391	10.394609	9.643891	10.356109	10.038501	9.961499	45	55
6	30	9.605462	10.394538	9.643977	10.356023	10.038515	9.961485	30	54
7	45	9.605534	10.394466	9.644062	10.355938	10.038528	9.961472	15	53
8	47	9.605606	10.394394	9.644148	10.355852	10.038542	9.961458	13	52
9	15	9.605677	10.394323	9.644234	10.355766	10 038556	9.961444	45	51
10	30	9.605749	10.394251	9.644319	10.355681	10.038570	9.961430	30	50
11	45	9.605821	10.394179	9.644405	10.355595	10.038584	9.961416	15	49
12	48	9.605892	10.394108	9.644490	10.355510	10.038598	9.961402	12	48
13	15	9.605964	10.394036	9.644576	10.355424	10.038612	9.961388	45	47
14	30	9.606035	10.393965	9.644661	10.355339	10.038626	9.961374	30	46
15	45	9.606107	10.393893	9.644747	10.355253	10.038640	9.961360	15	45
16	49	9.606179	10.393821	9.644832	10.355168	10.038654	9.961346	11	44
17	15	9.606250	10.393750	9.644918	10.355082	10.038668	9.961332	45	43
18	30	9.606322	10.393678	9.645003	10.354997	10.038682	9.961318	30	42
19	45	9.606393	10.393607	9.645089	10.354911	10.038696	9.961304	15	41
20	50	9.606465	10.393535	9.645174	10.354826	10.038710	9.961290	10	40
21	15	9.606536	10.393464	9.645260	10.354740	10.038724	9.961276	45	39
22	30	9.606608	10.393392	9.645345	10.354655	10.038738	9.961262	30	38
23	45	9.606679	10.393321	9.645431	10.354569	10.038751	9.961249	15	37
24	51	9.606751	10.393249	9.645516	10.354484	10.038765	9.961235	9	36
25	15	9.606822	10.393178	9.645601	10.354399	10.038779	9.961221	45	35
26	30	9.606893	10.393107	9.645687	10.354313	10.038793	9.961207	30	34
27	45	9.606965	10.393035	9.645772	10.354228	10.038807	9.961193	15	33
28	52	9.607036	10.392964	9.645857	10.354143	10.038821	9.961179	8	32
29	15	9.607108	10.392892	9.645943	10.354057	10.038835	9.961165	45	31
30	30	9.607179	10.392821	9.646028	10.353972	10.038849	9.961151	30	30
31	45	9.607250	10.392750	9.646113	10.353887	10.038863	9.961137	15	29
32	53	9.607322	10.392678	9.646199	10.353801	10.038877	9.961123	7	28
33	15	9.607393	10.392607	9.646284	10.353716	10.038891	9.961109	45	27
34	30	9.607464	10.392536	9.646369	10.353631	10.038905	9.961095	30	26
35	45	9.607535	10.392465	9.646455	10.353545	10.038919	9.961081	15	25
36	54	9.607607	10.392393	9.646540	10.353460	10.038933	9.961067	6	24
37	15	9.607678	10.392322	9.646625	10.353375	10.038947	9.961053	45	23
38	30	9.607749	10.392251	9.646710	10.353290	10.038961	9.961039	30	22
39	45	9.607821	10.392179	9.646796	10.353204	10.038975	9.961025	15	21
40	55	9.607892	10.392108	9.646881	10.353119	10.038989	9.961011	5	20
41	15	9.607963	10.392037	9.646966	10.353034	10.039003	9.960997	45	19
42	30	9.608034	10.391966	9.647051	10.352949	10.039017	9.960983	30	18
43	45	9.608105	10.391895	9.647137	10.352863	10.039031	9.960969	15	17
44	56	9.608176	10.391824	9.647222	10.352778	10.039045	9.960955	4	16
45	15	9.608248	10.391752	9.647307	10.352693	10.039059	9.960941	45	15
46	30	9.608319	10.391681	9.647392	10.352608	10.039073	9.960927	30	14
47	45	9.608390	10.391610	9.647477	10.352523	10.039087	9.960913	15	13
48	57	9.608461	10.391539	9.647562	10.352438	10.039101	9.960899	3	12
49	15	9.608532	10 391468	9.647647	10.352353	10.039115	9.960885	45	11
50	30	9.608603	10.391397	9.647733	10.352267	10.039129	9.960871	30	10
51	45	9.608674	10.391326	9.647818	10.352182	10.039143	9.960857	15	9
52	58	9.608745	10.391255	9.647903	10.352097	10.039157	9.960843	2	8
53	15	9.608816	10.391184	9.647988	10.352012	10.039172	9.960828	45	7
54	30	9.608887	10.391113	9.648073	10.351927	10.039186	9.960814	30	6
55	45	9.608958	10.391042	9.648158	10.351842	10.039200	9.960800	15	5
56	59	9.609029	10.390971	9.648243	10.351757	10.039214	9.960786	1	4
57	15	9.609100	10.390900	9.648328	10.351672	10.039228	9.960772	45	3
58	30	9.609171	10.390829	9.648413	10.351587	10.039242	9.960758	30	2
59	45	9.609242	10.390758	9.648498	10.351502	10.039256	9.960744	15	1
60	60	9.609313	10.390687	9.648583	10.351417	10.039270	9.960730	0	0
sec.	′ ″	cosine.	secant	cotangent.	tangent	cosecant.	sine.	′ ″	sec.
	4h 24m.		LOG. SINES, &c.				66 deg.		

1h 36m.			LOG. SINES, &c.				24 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	0	9.609313	10.390687	9.648583	10.351417	10.039270	9.960730	60	60
1	15	9.609384	10.390616	9.648668	10.351332	10.039284	9.960716	45	59
2	30	9.609455	10.390545	9.648753	10.351247	10.039298	9.960702	30	58
3	45	9.609526	10.390474	9.648838	10.351162	10.039312	9.960688	15	57
4	1	9.609597	10.390403	9.648923	10.351077	10.039326	9.960674	59	56
5	15	9.609668	10.390332	9.649008	10.350992	10.039340	9.960660	45	55
6	30	9.609739	10.390261	9.649093	10.350907	10.039354	9.960646	30	54
7	45	9.609809	10.390191	9.649178	10.350822	10.039368	9.960632	15	53
8	2	9.609880	10.390120	9.649263	10.350737	10.039382	9.960618	58	52
9	15	9.609951	10.390049	9.649348	10.350652	10.039397	9.960603	45	51
10	30	9.610022	10.389978	9.649433	10.350567	10.039411	9.960589	30	50
11	45	9.610093	10.389907	9.649517	10.350483	10.039425	9.960575	15	49
12	3	9.610163	10.389837	9.649602	10.350398	10.039439	9.960561	57	48
13	15	9.610234	10.389766	9.649687	10.350313	10.039453	9.960547	45	47
14	30	9.610305	10.389695	9.649772	10.350228	10.039467	9.960533	30	46
15	45	9.610376	10.389624	9.649857	10.350143	10.039481	9.960519	15	45
16	4	9.610446	10.389554	9.649942	10.350058	10.039495	9.960505	56	44
17	15	9.610517	10.389483	9.650026	10.349974	10.039509	9.960491	45	43
18	30	9.610588	10.389412	9.650111	10.349889	10.039523	9.960477	30	42
19	45	9.610659	10.389341	9.650196	10.349804	10.039538	9.960462	15	41
20	5	9.610729	10.389271	9.650281	10.349719	10.039552	9.960448	55	40
21	15	9.610800	10.389200	9.650366	10.349634	10.039566	9.960434	45	39
22	30	9.610870	10.389130	9.650450	10.349550	10.039580	9.960420	30	38
23	45	9.610941	10.389059	9.650535	10.349465	10.039594	9.960406	15	37
24	6	9.611012	10.388988	9.650620	10.349380	10.039608	9.960392	54	36
25	15	9.611082	10.388918	9.650705	10.349295	10.039622	9.960378	45	35
26	30	9.611153	10.388847	9.650789	10.349211	10.039636	9.960364	30	34
27	45	9.611223	10.388777	9.650874	10.349126	10.039651	9.960349	15	33
28	7	9.611294	10.388706	9.650959	10.349041	10.039665	9.960335	53	32
29	15	9.611365	10.388635	9.651043	10.348957	10.039679	9.960321	45	31
30	30	9.611435	10.388565	9.651128	10.348872	10.039693	9.960307	30	30
31	45	9.611506	10.388494	9.651213	10.348787	10.039707	9.960293	15	29
32	8	9.611576	10.388424	9.651297	10.348703	10.039721	9.960279	52	28
33	15	9.611647	10.388353	9.651382	10.348618	10.039735	9.960265	45	27
34	30	9.611717	10.388283	9.651467	10.348533	10.039750	9.960250	30	26
35	45	9.611788	10.388212	9.651551	10.348449	10.039764	9.960236	15	25
36	9	9.611858	10.388142	9.651636	10.348364	10.039778	9.960222	51	24
37	15	9.611928	10.388072	9.651720	10.348280	10.039792	9.960208	45	23
38	30	9.611999	10.388001	9.651805	10.348195	10.039806	9.960194	30	22
39	45	9.612069	10.387931	9.651890	10.348110	10.039820	9.960180	15	21
40	10	9.612140	10.387860	9.651974	10.348026	10.039835	9.960165	50	20
41	15	9.612210	10.387790	9.652059	10.347941	10.039849	9.960151	45	19
42	30	9.612280	10.387720	9.652143	10.347857	10.039863	9.960137	30	18
43	45	9.612351	10.387649	9.652228	10.347772	10.039877	9.960123	15	17
44	11	9.612421	10.387579	9.652312	10.347688	10.039891	9.960109	49	16
45	15	9.612491	10.387509	9.652397	10.347603	10.039905	9.960095	45	15
46	30	9.612562	10.387438	9.652481	10.347519	10.039920	9.960080	30	14
47	45	9.612632	10.387368	9.652566	10.347434	10.039934	9.960066	15	13
48	12	9.612702	10.387298	9.652650	10.347350	10.039948	9.960052	48	12
49	15	9.612773	10.387227	9.652735	10.347265	10.039962	9.960038	45	11
50	30	9.612843	10.387157	9.652819	10.347181	10.039976	9.960024	30	10
51	45	9.612913	10.387087	9.652904	10.347096	10.039991	9.960009	15	9
52	13	9.612983	10.387017	9.652988	10.347012	10.040005	9.959995	47	8
53	15	9.613053	10.386947	9.653072	10.346928	10.040019	9.959981	45	7
54	30	9.613124	10.386876	9.653157	10.346843	10.040033	9.959967	30	6
55	45	9.613194	10.386806	9.653241	10.346759	10.040047	9.959953	15	5
56	14	9.613264	10.386736	9.653326	10.346674	10.040062	9.959938	46	4
57	15	9.613334	10.386666	9.653410	10.346590	10.040076	9.959924	45	3
58	30	9.613404	10.386596	9.653494	10.346506	10.040090	9.959910	30	2
59	45	9.613474	10.386526	9.653579	10.346421	10.040104	9.959896	15	1
60	15	9.613545	10.386455	9.653663	10.346337	10.040119	9.959881	45	0
sec.	′ ″	cosine	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
4h 23m.			LOG. SINES, &c.				65 deg.		

1h 37m.			LOG. SINES, &c.				24 deg.		
sec.	′ ′	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	′ ′	sec.
0	15	9.613545	10.386455	9.653063	10.346337	10 040119	9.959881	45	60
1	15	9.613615	10.386385	9.653747	10.346253	10.040133	9.959867	45	59
2	30	9.613685	10.386315	9.653832	10.346168	10.040147	9.959853	30	58
3	45	9.613755	10.386245	9.653916	10.346084	10.040161	9.959839	15	57
4	16	9.613825	10.386175	9.654000	10.346000	10.040175	9.959825	44	56
5	15	9.613895	10.386105	9.654085	10.345915	10.040190	9.959810	45	55
6	30	9.613965	10.386035	9.654169	10.345831	10.040204	9.959796	30	54
7	45	9.614035	10.385965	9.654253	10.345747	10.040218	9.959782	15	53
8	17	9.614105	10.385895	9 654337	10.345663	10.040232	9.959768	43	52
9	15	9.614175	10.385825	9.654422	10.345578	10.040247	9.959753	45	51
10	30	9.614245	10.385755	9.654506	10.345494	10.040261	9.959739	30	50
11	45	9.614315	10.385685	9.654590	10.345410	10.040275	9.959725	15	49
12	18	9.614385	10.385615	9.654674	10.345326	10.040289	9.959711	42	48
13	15	9.614455	10.385545	9.654759	10.345241	10.040304	9.959696	45	47
14	30	9.614525	10.385475	9.654843	10.345157	10.040318	9.959682	30	46
15	45	9.614595	10.385405	9.654927	10.345073	10.040332	9.959668	15	45
16	19	9.614665	10.385335	9.655011	10.344989	10.040347	9.959653	41	44
17	15	9.614735	10.385265	9.655095	10.344905	10.040361	9.959639	45	43
18	30	9.614804	10.385196	9.655179	10.344821	10.040375	9.959625	30	42
19	45	9.614874	10.385126	9.655264	10.344736	10.040389	9.959611	15	41
20	20	9.614944	10.385056	9.655348	10.344652	10.040404	9.959596	40	40
21	15	9.615014	10.384986	9.655432	10.344568	10.040418	9.959582	45	39
22	30	9.615084	10.384916	9.655516	10.344484	10.040432	9.959568	30	38
23	45	9.615154	10.384846	9.655600	10.344400	10.040446	9.959554	15	37
24	21	9.615223	10.384777	9.655684	10.344316	10.040461	9.959539	39	36
25	15	9.615293	10.384707	9.655768	10.344232	10.040475	9.959525	45	35
26	30	9.615363	10.384637	9.655852	10.344148	10.040489	9.959511	30	34
27	45	9.615433	10.384567	9.655936	10.344064	10.040504	9.959496	15	33
28	22	9.615502	10.384498	9.656020	10.343980	10 040518	9.959482	38	32
29	15	9.615572	10.384428	9.656104	10.343896	10.040532	9.959468	45	31
30	30	9.615642	10.384358	9.656188	10.343812	10 040547	9.959453	30	30
31	45	9.615712	10.384288	9.656272	10.343728	10.040561	9.959439	15	29
32	23	9.615781	10.384219	9.656356	10.343644	10.040575	9.959425	37	28
33	15	9.615851	10.384149	9.656440	10.343560	10.040590	9.959410	45	27
34	30	9.615921	10.384079	9.656524	10.343476	10.040604	9.959396	30	26
35	45	9.615990	10.384010	9.656608	10.343392	10.040618	9.959382	15	25
36	24	9.616060	10.383940	9.656692	10.343308	10.040633	9.959367	36	24
37	15	9.616129	10.383871	9.656776	10.343224	10.040647	9.959353	45	23
38	30	9.616199	10.383801	9.656860	10.343140	10.040661	9.959339	30	22
39	45	9.616269	10.383731	9.656944	10.343056	10.040675	9.959325	15	21
40	25	9.616338	10.383662	9.657028	10.342972	10.040690	9.959310	35	20
41	15	9.616408	10.383592	9.657112	10.342888	10.040704	9.959296	45	19
42	30	9.616477	10.383523	9.657196	10.342804	10.040719	9.959281	30	18
43	45	9.616547	10.383453	9.657280	10.342720	10.040733	9.959267	15	17
44	26	9.616616	10.383384	9.657364	10.342636	10.040747	9.959253	34	16
45	15	9.616686	10.383314	9.657447	10.342553	10.040762	9.959238	45	15
46	30	9.616755	10.383245	9.657531	10.342469	10.040776	9.959224	30	14
47	45	9.616825	10.383175	9.657615	10.342385	10.040790	9.959210	15	13
48	27	9.616894	10.383106	9.657699	10.342301	10.040805	9.959195	33	12
49	15	9.616964	10.383036	9.657783	10.342217	10.040819	9.959181	45	11
50	30	9.617033	10.382967	9.657867	10.342133	10.040833	9.959167	30	10
51	45	9.617103	10.382897	9.657950	10.342050	10.040848	9.959152	15	9
52	28	9.617172	10.382828	9.658034	10.341966	10.040862	9.959138	32	8
53	15	9.617241	10.382759	9.658118	10.341882	10.040876	9.959124	45	7
54	30	9.617311	10.382689	9.658202	10.341798	10.040891	9.959109	30	6
55	45	9.617380	10.382620	9.658285	10.341715	10.040905	9.959095	15	5
56	29	9.617450	10.382550	9.658369	10.341631	10.040920	9.959080	31	4
57	15	9.617519	10.382481	9.658453	10.341547	10.040934	9.959066	45	3
58	30	9.617588	10.382412	9.658537	10.341463	10.040948	9.959052	30	2
59	45	9.617658	10.382342	9.658620	10.341380	10.040963	9.959037	15	1
60	30	9.617727	10.382273	9.658704	10.341296	10.040977	9.959023	30	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
4h 22m.			LOG. SINES, &c.				65 deg.		

	1h 38m.			LOG. SINES, &c.			24 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	30	9.617727	10.382273	9.658704	10.341296	10.040977	9.959023	30	60
1	15	9.617796	10.382204	9.658788	10.341212	10.040992	9.959008	45	59
2	30	9.617865	10.382135	9.658871	10.341129	10.041006	9.958994	30	58
3	45	9.617935	10.382065	9.658955	10.341045	10.041020	9.958980	15	57
4	31	9.618004	10.381996	9.659039	10.340961	10.041035	9 958965	29	56
5	15	9.618073	10.381927	9.659122	10.340878	10.041049	9.958951	45	55
6	30	9.618142	10.381858	9.659206	10.340794	10.041064	9.958936	30	54
7	45	9.618212	10.381788	9.659290	10.340710	10.041078	9.958922	15	53
8	32	9.618281	10.381719	9.659373	10.340627	10.041092	9.958908	28	52
9	15	9.618350	10.381650	9.659457	10.340543	10.041107	9.958893	45	51
10	30	9.618419	10.381581	9.659540	10.340460	10.041121	9.958879	30	50
11	45	9.618488	10.381512	9.659624	10.340376	10.041136	9.958864	15	49
12	33	9.618558	10.381442	9.659708	10.340292	10.041150	9.958850	27	48
13	15	9.618627	10.381373	9.659791	10.340209	10.041164	9.958836	45	47
14	30	9.618696	10.381304	9.659875	10.340125	10.041179	9.958821	30	46
15	45	9.618765	10.381235	9.659958	10.340042	10.041193	9.958807	15	45
16	34	9.618834	10.381166	9.660042	10.339958	10.041208	9.958792	26	44
17	15	9.618903	10.381097	9.660125	10.339875	10.041222	9.958778	45	43
18	30	9.618972	10.381028	9.660209	10.339791	10.041237	9.958763	30	42
19	45	9.619041	10.380959	9.660292	10.339708	10.041251	9.958749	15	41
20	35	9.619110	10.380890	9.660376	10.339624	10.041266	9.958734	25	40
21	15	9.619179	10.380821	9.660459	10.339541	10.041280	9.958720	45	39
22	30	9.619248	10.380752	9.660543	10.339457	10.041294	9.958706	30	38
23	45	9.619317	10.380683	9 660626	10.339374	10.041309	9.958691	15	37
24	36	9.619386	10.380614	9.660710	10.339290	10.041323	9.958677	24	36
25	15	9.619455	10.380545	9.660793	10.339207	10.041338	9.958662	45	35
26	30	9.619524	10.380476	9.660877	10.339123	10.041352	9.958648	30	34
27	45	9.619593	10.380407	9.660960	10.339049	10.041367	9.958633	15	33
28	37	9.619662	10.380338	9.661043	10.338957	10.041381	9.958619	23	32
29	15	9.619731	10.380269	9.661127	10.338873	10 041396	9.958604	45	31
30	30	9.619800	10.380200	9.661210	10.338790	10.041410	9.958590	30	30
31	45	9.619869	10.380131	9.661293	10.338707	10.041425	9.958575	15	29
32	38	9.619938	10.380062	9.661377	10.338623	10.041439	9.958561	22	28
33	15	9.620007	10.379993	9.661460	10.338540	10.041454	9.958546	45	27
34	30	9.620075	10.379925	9.661544	10.338456	10.041468	9.958532	30	26
35	45	9.620144	10.379856	9.661627	10.338373	10.041483	9.958517	15	25
36	39	9.620213	10.379787	9.661710	10.338290	10.041497	9.958503	21	24
37	15	9.620282	10.379718	9.661794	10.338206	10.041512	9.958488	45	23
38	30	9.620351	10.379649	9.661877	10.338123	10.041526	9.958474	30	22
39	45	9.620420	10.379580	9.661960	10.338040	10.041541	9.958459	15	21
40	40	9.620488	10.379512	9.662043	10.337957	10.041555	9.958445	20	20
41	15	9.620557	10.379443	9.662127	10.337873	10.041570	9.958430	45	19
42	30	9.620626	10.379374	9.662210	10.337790	10.041584	9.958416	30	18
43	45	9.620695	10.379305	9.662293	10.337707	10.041599	9.958401	15	17
44	41	9.620763	10.379237	9.662376	10.337624	10.041613	9.958387	19	16
45	15	9.620832	10.379168	9.662460	10.337540	10.041628	9.958372	45	15
46	30	9.620901	10.379099	9.662543	10.337457	10.041642	9.958358	30	14
47	45	9.620969	10.379031	9.662626	10.337374	10.041657	9.958343	15	13
48	42	9.621038	10.378962	9.662709	10.337291	10.041671	9.958329	18	12
49	15	9.621107	10.378893	9.662792	10.337208	10.041686	9.958314	45	11
50	30	9.621175	10.378825	9.662876	10.337124	10.041700	9.958300	30	10
51	45	9.621244	10.378756	9.662959	10.337041	10.041715	9.958285	15	9
52	43	9.621313	10.378687	9.663042	10.336958	10.041729	9.958271	17	8
53	15	9.621381	10.378619	9.663125	10.336875	10.041744	9.958256	45	7
54	30	9.621450	10.378550	9.663208	10 336792	10.041758	9.958242	30	6
55	45	9.621518	10.378482	9.663291	10.336709	10.041773	9.958227	15	5
56	44	9.621587	10.378413	9.663374	10.336626	10.041788	9.958212	16	4
57	15	9.621656	10.378344	9.663458	10.336542	10.041802	9.958198	45	3
58	30	9.621724	10.378276	9.663541	10.336459	10.041817	9.958183	30	2
59	45	9.621793	10.378207	9.663624	10.336376	10.041831	9.958169	15	1
60	45	9.621861	10.378139	9.663707	10.336293	10.041846	9.958154	15	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine	″ ′	sec.
	4″ 21m.			LOG. SINES, &c.			65 deg.		

1h 39m.				LOG. SINES, &c.			24 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	45	9.621861	10.378139	9.663707	10.336293	10.041846	9.958154	15	60
1	15	9.621930	10.378070	9.663790	10.336210	10.041860	9 958140	45	59
2	30	9.621998	10.378002	9.663873	10.336127	10.041875	9.958125	30	58
3	45	9.622067	10.377933	9.663956	10.336044	10.041889	9.958111	15	57
4	46	9.622135	10.377865	9.664039	10.335961	10.041904	9.958096	14	56
5	15	9.622204	10.377796	9.664122	10.335878	10.041919	9.958081	45	55
6	30	9.622272	10.377728	9.664205	10.335795	10.041933	9.958067	30	54
7	45	9.622340	10.377660	9.664288	10.335712	10.041948	9.958052	15	53
8	47	9.622409	10.377591	9.664371	10.335629	10.041962	9.958038	13	52
9	15	9.622477	10.377523	9.664454	10.335546	10.041977	9.958023	45	51
10	30	9.622546	10.377454	9.664537	10.335463	10.041991	9.958009	30	50
11	45	9.622614	10.377386	9.664620	10.335380	10.042006	9.957994	15	49
12	48	9.622682	10.377318	9.664703	10.335297	10.042021	9.957979	12	48
13	15	9.622751	10.377249	9.664786	10.335214	10.042035	9.957965	45	47
14	30	9.622819	10.377181	9.664869	10.335131	10.042050	9.957950	30	46
15	45	9.622887	10.377113	9.664952	10.335048	10.042064	9.957936	15	45
16	49	9.622956	10.377044	9.665035	10.334965	10.042079	9.957921	11	44
17	15	9.623024	10.376976	9.665117	10.334883	10.042094	9.957906	45	43
18	30	9.623092	10.376908	9.665200	10. 334800	10.042108	9.957892	30	42
19	45	9.623160	10 376840	9.665283	10.334717	10.042123	9.957877	15	41
20	50	9.623229	10.376771	9.665366	10.334634	10.042137	9.957863	10	40
21	15	9.623297	10.376703	9.665449	10.334551	10.042152	9.957848	45	39
22	30	9.623365	10.376635	9.665532	10.334468	10.042167	9.957833	30	38
23	45	9.623433	10.376567	9.665615	10.334385	10.042181	9.957819	15	37
24	51	9.623502	10.376498	9.665697	10.334303	10.042196	9.957804	9	36
25	15	9.623570	10.376430	9.665780	10.334220	10.042211	9.957789	45	35
26	30	9.623638	10.376362	9.665863	10.334137	10.042225	9.957775	30	34
27	45	9.623706	10.376294	9.665946	10.334054	10.042240	9.957760	15	33
28	52	9.623774	10.376226	9.666029	10.333971	10.042254	9.957746	8	32
29	15	9.623842	10.376158	9.666111	10.333889	10.042269	9.957731	45	31
30	30	9.623911	10.376089	9.666194	10.333806	10.042284	9.957716	30	30
31	45	9.623979	10.376021	9.666277	10.333723	10.042298	9.957702	15	29
32	53	9.624047	10.375953	9.666360	10.333640	10.042313	9.957687	7	28
33	15	9.624115	10.375885	9.666442	10.333558	10.042328	9.957672	45	27
34	30	9.624183	10.375817	9.666525	10.333475	10.042342	9.957658	30	26
35	45	9.624251	10.375749	9.666608	10.333392	10.042357	9.957643	15	25
36	54	9.624319	10.375681	9.666691	10.333309	10.042372	9.957628	6	24
37	15	9.624387	10.375613	9.666773	10.333227	10.042386	9.957614	45	23
38	30	9.624455	10.375545	9.666856	10.333144	10.042401	9.957599	30	22
39	45	9.624523	10.375477	9.666939	10.333061	10.042416	9.957584	15	21
40	55	9.624591	10.375409	9.667021	10.332979	10.042430	9.957570	5	20
41	15	9.624659	10.375341	9.667104	10.332896	10.042445	9.957555	45	19
42	30	9.624727	10.375273	9.667187	10.332813	10.042460	9.957540	30	18
43	45	9.624795	10.375205	9.667269	10.332731	10.042474	9.957526	15	17
44	56	9.624863	10.375137	9.667352	10.332648	10.042489	9.957511	4	16
45	15	9.624931	10.375069	9.667435	10.332565	10.042504	9.957496	45	15
46	30	9.624999	10.375001	9.667517	10.332483	10.042518	9.957482	30	14
47	45	9.625067	10.374933	9.667600	10.332400	10.042533	9.957467	15	13
48	57	9.625135	10.374865	9.667682	10.332318	10.042548	9.957452	3	12
49	15	9.625202	10.374798	9.667765	10.332235	10.042563	9.957437	45	11
50	30	9.625270	10.374730	9.667847	10.332153	10.042577	9.957423	30	10
51	45	9.625338	10.374662	9.667930	10.332070	10.042592	9.957408	15	9
52	58	9.625406	10.374594	9.668013	10.331987	10.042607	9.957393	2	8
53	15	9.625474	10.374526	9.668095	10.331905	10.042621	9.957379	45	7
54	30	9.625542	10.374458	9.668178	10.331822	10.042636	9.957364	30	6
55	45	9.625609	10.374391	9.668260	10.331740	10.042651	9.957349	15	5
56	59	9.625677	10.374323	9.668343	10.331657	10 042665	9.957335	1	4
57	15	9.625745	10.374255	9.668425	10.331575	10.042680	9.957320	45	3
58	30	9.625813	10.374187	9.668508	10.331492	10.042695	9.957305	30	2
59	45	9.625880	10.374120	9.668590	10.331410	10.042710	9.957290	15	1
60	60	9.625948	10.374052	9.668672	10.331328	10.042724	9.957276	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
4h 20m.				LOG. SINES, &c.			65 deg.		

1h 40m.			LOG. SINES, &c.				25 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	0	9.625948	10.374052	9.668672	10.331328	10.042724	9.957276	60	60
1	15	9.626016	10.373984	9.668755	10.331245	10.042739	9 957261	45	59
2	30	9.626084	10.373916	9.668837	10.331163	10 042754	9 957246	30	58
3	45	9.626151	10.373849	9.668920	10.331080	10.042769	9.957231	15	57
4	1	9.626219	10.373781	9.669002	10.330998	10.042783	9.957217	59	56
5	15	9.626287	10.373713	9.669085	10.330915	10.042798	9.957202	45	55
6	30	9.626354	10.373646	9.669167	10.330833	10.042813	9.957187	30	54
7	45	9.626422	10.373578	9.669249	10.330751	10.042827	9.957173	15	53
8	2	9.626490	10.373510	9.669332	10.330668	10.042842	9.957158	58	52
9	15	9.626557	10.373443	9.669414	10.330586	10.042857	9.957143	45	51
10	30	9.626625	10.373375	9.669497	10.330503	10.042872	9.957128	30	50
11	45	9.626692	10.373308	9.669579	10.330421	10.042887	9.957113	15	49
12	3	9.626760	10.373240	9.669661	10.330339	10.042901	9.957099	57	48
13	15	9.626828	10.373172	9.669744	10.330256	10 042916	9.957084	45	47
14	30	9.626895	10.373105	9.669826	10.330174	10.042931	9.957069	30	46
15	45	9.626963	10.373037	9.669908	10.330092	10 042946	9.957054	15	45
16	4	9.627030	10.372970	9.669991	10.330009	10.042960	9.957040	56	44
17	15	9.627098	10.372902	9.670073	10.329927	10.042975	9.957025	45	43
18	30	9.627165	10.372835	9.670155	10.329845	10.042990	9.957010	30	42
19	45	9.627233	10.372767	9.670237	10.329763	10.043005	9.956995	15	41
20	5	9.627300	10.372700	9.670320	10.329680	10.043019	9.956981	55	40
21	15	9.627368	10.372632	9.670402	10.329598	10.043034	9.956966	45	39
22	30	9.627435	10.372565	9.670484	10.329516	10.043049	9.956951	30	38
23	45	9.627503	10.372497	9.670566	10.329434	10.043064	9.956936	15	37
24	6	9.627570	10.372430	9.670649	10.329351	10.043079	9.956921	54	36
25	15	9.627637	10.372363	9.670731	10.329269	10.043093	9.956907	45	35
26	30	9.627705	10.372295	9.670813	10.329187	10.043108	9.956892	30	34
27	45	9.627772	10.372228	9.670895	10.329105	10.043123	9.956877	15	33
28	7	9.627840	10.372160	9.670977	10.329023	10.043138	9.956862	53	32
29	15	9.627907	10.372093	9.671060	10.328940	10.043153	9.956847	45	31
30	30	9.627974	10.372026	9.671142	10.328858	10.043167	9.956833	30	30
31	45	9.628042	10.371958	9.671224	10.328776	10.043182	9.956818	15	29
32	8	9.628109	10.371891	9.671306	10.328694	10.043197	9.956803	52	28
33	15	9.628176	10.371824	9.671388	10.328612	10.043212	9.956788	45	27
34	30	9.628244	10.371756	9.671470	10.328530	10.043227	9.956773	30	26
35	45	9.628311	10.371689	9.671552	10.328448	10.043242	9.956758	15	25
36	9	9.628378	10.371622	9.671634	10.328366	10.043256	9.956744	51	24
37	15	9.628445	10.371555	9.671717	10.328283	10.043271	9.956729	45	23
38	30	9.628513	10.371487	9.671799	10.328201	10.043286	9.956714	30	22
39	45	9.628580	10.371420	9.671881	10.328119	10.043301	9.956699	15	21
40	10	9.628647	10.371353	9.671963	10.328037	10.043316	9.956684	50	20
41	15	9.628714	10.371286	9.672045	10.327955	10.043331	9.956669	45	19
42	30	9.628782	10.371218	9.672127	10.327873	10.043345	9.956655	30	18
43	45	9.628849	10.371151	9.672209	10.327791	10.043360	9.956640	15	17
44	11	9.628916	10.371084	9.672291	10.327709	10.043375	9.956625	49	16
45	15	9.628983	10.371017	9.672373	10.327627	10.043390	9.956610	45	15
46	30	9.629050	10.370950	9.672455	10.327545	10 043405	9.956595	30	14
47	45	9.629117	10.370883	9.672537	10.327463	10.043420	9.956580	15	13
48	12	9.629184	10.370816	9.672619	10.327381	10.043434	9.956566	48	12
49	15	9.629252	10.370748	9.672701	10.327299	10.043449	9.956551	45	11
50	30	9.629319	10.370681	9.672783	10.327217	10.043464	9.956536	30	10
51	45	9.629386	10.370614	9.672865	10.327135	10.043479	9.956521	15	9
52	13	9.629453	10.370547	9.672947	10.327053	10.043494	9.956506	47	8
53	15	9.629520	10.370480	9.673029	10.326971	10.043509	9.956491	45	7
54	30	9.629587	10.370413	9.673111	10.326889	10.043524	9.956476	30	6
55	45	9.629654	10.370346	9.673193	10.326807	10.043539	9.956461	15	5
56	14	9.629721	10.370279	9.673274	10.326726	10.043553	9.956447	46	4
57	15	9.629788	10.370212	9.673356	10.326644	10.043568	9.956432	45	3
58	30	9.629855	10.370145	9.673438	10.326562	10.043583	9.956417	30	2
59	45	9.629922	10.370078	9.673520	10.326480	10.043598	9.956402	15	1
60	15	9.629989	10.370011	9.673602	10.326398	10.043613	9.956387	45	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
4h 19m.			LOG. SINES, &c.				64 deg.		

1h 41m.			LOG. SINES, &c.				25 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	15	9.629989	10.370011	9.673602	10.326398	10.043613	9.956387	45	60
1	15	9.630056	10.369944	9.673684	10.326316	10.043628	9.956372	45	59
2	30	9.630123	10.369877	9.673766	10.326234	10.043643	9.956357	30	58
3	45	9.630190	10 369810	9.673847	10.326153	10.043658	9.956342	15	57
4	16	9.630257	10.369743	9.673929	10.326071	10.043673	9.956327	44	56
5	15	9.630324	10.369676	9.674011	10.325989	10.043688	9.956312	45	55
6	30	9.630391	10.369609	9.674003	10.325907	10.043702	9.956298	30	54
7	45	9.630457	10.369543	9.674175	10.325825	10.043717	9.956283	15	53
8	17	9.630524	10.369476	9.674257	10.325743	10.043732	9.956268	43	52
9	15	9.630591	10.369409	9.674338	10.325662	10.043747	9.956253	45	51
10	30	9.630658	10.369342	9.674420	10.325580	10.043762	9.956238	30	50
11	45	9.630725	10.369275	9.674502	10 325498	10.043777	9.956223	15	49
12	18	9.630792	10.369208	9.674584	10 325416	10.043792	9.956208	42	48
13	15	9.630858	10.369142	9.674665	10.325335	10.043807	9.956193	45	47
14	30	9.630925	10.369075	9.674747	10.325253	10.043822	9.956178	30	46
15	45	9.630992	10.369008	9.674829	10.325171	10.043837	9.956163	15	45
16	19	9.631059	10.368941	9.674910	10.325090	10.043852	9.956148	41	44
17	15	9.631126	10.368874	9.674992	10.325008	10.043867	9.956133	45	43
18	30	9.631192	10.368808	9.675074	10.324926	10.043882	9.956118	30	42
19	45	9.631259	10.368741	9.675156	10.324844	10.043897	9.956103	15	41
20	20	9.631326	10.368674	9.675237	10.324763	10.043911	9.956089	40	40
21	15	9.631392	10.368608	9.675319	10.324681	10.043926	9.956074	45	39
22	30	9.631459	10.368541	9.675401	10.324599	10.043941	9.956059	30	38
23	45	9.631526	10.368474	9.675482	10.324518	10.043956	9.956044	15	37
24	21	9.631593	10.368407	9.675564	10.324436	10.043971	9.956029	39	36
25	15	9.631659	10.368341	9.675645	10.324355	10.043986	9.956014	45	35
26	30	9.631726	10.368274	9.675727	10.324273	10.044001	9.955999	30	34
27	45	9.631792	10.368208	9.675809	10.324191	10.044016	9.955984	15	33
28	22	9.631859	10.368141	9.675890	10.324110	10.044031	9.955969	38	32
29	15	9.631926	10.368074	9.675972	10.324028	10.044046	9.955954	45	31
30	30	9.631992	10.368008	9.676053	10.323947	10.044061	9.955939	30	30
31	45	9.632059	10.367941	9.676135	10.323865	10.044076	9.955924	15	29
32	23	9.632125	10.367875	9.676216	10.323784	10.044091	9.955909	37	28
33	15	9.632192	10.367808	9.676298	10.323702	10.044106	9.955894	45	27
34	30	9.632259	10.367741	9.676380	10.323620	10.044121	9.955879	30	26
35	45	9.632325	10.367675	9.676461	10.323539	10.044136	9.955864	15	25
36	24	9.632392	10.367608	9.676543	10.323457	10.044151	9 955849	36	24
37	15	9 632458	10.367542	9.676624	10.323376	10.044166	9.955834	45	23
38	30	9.632525	10.367475	9.676706	10.323294	10.044181	9.955819	30	22
39	45	9.632591	10.367409	9.676787	10.323213	10.044196	9.955804	15	21
40	25	9.632658	10.367342	9.676869	10.323131	10.044211	9.955789	35	20
41	15	9.632724	10.367276	9.676950	10.323050	10.044226	9.955774	45	19
42	30	9.632790	10.367210	9.677031	10.322969	10.044241	9.955759	30	18
43	45	9.632857	10.367143	9.677113	10.322887	10.044256	9.955744	15	17
44	26	9.632923	10.367077	9.677194	10.322806	10.044271	9.955729	34	16
45	15	9.632990	10.367010	9.677276	10.322724	10.044286	9.955714	45	15
46	30	9.633056	10.366944	9.677357	10.322643	10.044301	9.955699	30	14
47	45	9.633122	10.366878	9.677439	10.322561	10.044316	9.955684	15	13
48	27	9.633189	10.366811	9.677520	10.322480	10.044331	9.955669	33	12
49	15	9.633255	10.366745	9.677601	10.322399	10 044346	9.955654	45	11
50	30	9.633322	10.366678	9.677683	10.322317	10.044361	9.955639	30	10
51	45	9.633388	10.366612	9.677764	10.322236	10.044376	9.955624	15	9
52	28	9.633454	10.366546	9.677846	10.322154	10.044391	9.955609	32	8
53	15	9.633520	10.366480	9.677927	10.322073	10.044406	9.955594	45	7
54	30	9.633587	10.366413	9.678008	10.321992	10.044421	9.955579	30	6
55	45	9.633653	10.366347	9.678090	10.321910	10.044437	9.955563	15	5
56	29	9.633719	10.366281	9.678171	10.321829	10.044452	9.955548	31	4
57	15	9.633786	10.366214	9.678252	10.321748	10.044467	9.955533	45	3
58	30	9.633852	10.366148	9.678333	10.321667	10.044482	9.955518	30	2
59	45	9.633918	10.366082	9.678415	10.321585	10.044497	9.955503	15	1
60	30	9.633984	10.366016	9.678496	10.321504	10.044512	9.955488	30	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
4h 18m.			LOG. SINES, &c.				64 deg.		

sec.	″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	1h 42m.		LOG. SINES, &c.				25 deg.		
0	30	9.633984	10.366016	9.678496	10.321504	10.044512	9.955488	30	60
1	15	9.634051	10.365949	9.678577	10.321423	10.044527	9.955473	45	59
2	30	9.634117	10 365883	9.678659	10.321341	10.044542	9.955458	30	58
3	45	9.634183	10.365817	9.678740	10.321260	10.044557	9.955443	15	57
4	31	9.634249	10.365751	9.678821	10.321179	10.044572	9.955428	29	56
5	15	9.634315	10.365685	9.678902	10.321098	10.044587	9.955413	45	55
6	30	9.634381	10.365619	9.678984	10.321016	10.044602	9.955398	30	54
7	45	9.634447	10.365553	9.679065	10.320935	10.044617	9.955383	15	53
8	32	9.634514	10.365486	9.679146	10.320854	10.044632	9.955368	28	52
9	15	9.634580	10.365420	9.679227	10.320773	10.044647	9.955353	45	51
10	30	9.634646	10.365354	9.679308	10.320692	10.044663	9.955337	30	50
11	45	9.634712	10.365288	9.679390	10.320610	10.044678	9.955322	15	49
12	33	9.634778	10.365222	9.679471	10.320529	10.044693	9.955307	27	48
13	15	9.634844	10.365156	9.679552	10.320448	10.044708	9.955292	45	47
14	30	9.634910	10.365090	9.679633	10.320367	10.044723	9.955277	30	46
15	45	9.634976	10.365024	9.679714	10.320286	10.044738	9.955262	15	45
16	34	9.635042	10.364958	9.679795	10.320205	10.044753	9.955247	26	44
17	15	9.635108	10.364892	9.679876	10.320124	10.044768	9.955232	45	43
18	30	9.635174	10.364826	9.679958	10.320042	10.044783	9.955217	30	42
19	45	9.635240	10.364760	9.680039	10.319961	10.044799	9.955201	15	41
20	35	9.635306	10.364694	9.680120	10.319880	10.044814	9.955186	25	40
21	15	9.635372	10.364628	9.680201	10.319799	10.044829	9.955171	45	39
22	30	9.635438	10.364562	9.680282	10.319718	10.044844	9.955156	30	38
23	45	9.635504	10.364496	9.680363	10.319637	10.044859	9.955141	15	37
24	36	9.635570	10.364430	9.680444	10.319556	10.044874	9.955126	24	36
25	15	9.635636	10.364364	9.680525	10.319475	10.044889	9.955111	45	35
26	30	9.635702	10.364298	9.680606	10.319394	10.044904	9.955096	30	34
27	45	9.635768	10.364232	9.680687	10.319313	10.044920	9.955080	15	33
28	37	9.635833	10.364167	9.680768	10.319232	10.044935	9.955065	23	32
29	15	9.635899	10.364101	9.680849	10.319151	10.044950	9.955050	45	31
30	30	9.635965	10.364035	9.680930	10.319070	10.044965	9.955035	30	30
31	45	9.636031	10.363969	9.681011	10.318989	10.044980	9.955020	15	29
32	38	9 636097	10.363903	9.681092	10.318908	10.044995	9.955005	22	28
33	15	9.636163	10.363837	9.681173	10.318827	10.045010	9.954990	45	27
34	30	9.636228	10.363772	9.681254	10.318746	10.045026	9.954974	30	26
35	45	9.636294	10.363706	9.681335	10.318665	10.045041	9.954959	15	25
36	39	9.636360	10.363640	9.681416	10.318584	10.045056	9.954944	21	24
37	15	9.636426	10.363574	9.681497	10.318503	10.045071	9.954929	45	23
38	30	9.636492	10.363508	9.681578	10.318422	10.045086	9.954914	30	22
39	45	9 636557	10.363443	9.681659	10.318341	10.045101	9.954899	15	21
40	40	9.636623	10.363377	9.681740	10.318260	10.045117	9.954883	20	20
41	15	9.636689	10.363311	9.681820	10.318180	10.045132	9.954868	45	19
42	30	9.636754	10.363246	9.681901	10.318099	10.045147	9.954853	30	18
43	45	9.636820	10.363180	9.681982	10.318018	10.045162	9.954838	15	17
44	41	9.636886	10.363114	9.682063	10.317937	10.045177	9.954823	19	16
45	15	9.636951	10.363049	9.682144	10.317856	10.045193	9.954807	45	15
46	30	9.637017	10.362983	9.682225	10.317775	10.045208	9.954792	30	14
47	45	9.637083	10.362917	9.682306	10.317694	10.045223	9.954777	15	13
48	42	9.637148	10.362852	9.682386	10.317614	10.045238	9.954762	18	12
49	15	9.637214	10.362786	9.682467	10.317533	10.045253	9.954747	45	11
50	30	9.637280	10.362720	9.682548	10.317452	10.045269	9.954731	30	10
51	45	9.637345	10.362655	9.682629	10.317371	10.045284	9.954716	15	9
52	43	9.637411	10.362589	9.682710	10.317290	10.045299	9.954701	17	8
53	15	9.637476	10.362524	9.682790	10.317210	10.045314	9.954686	45	7
54	30	9.637542	10.362458	9.682871	10.317129	10.045329	9.954671	30	6
55	45	9.637607	10.362393	9.682952	10.317048	10.045345	9.954655	15	5
56	44	9.637673	10.362327	9.683033	10.316967	10.045360	9.954640	16	4
57	15	9.637739	10.362261	9.683114	10.316886	10.045375	9.954625	45	3
58	30	9.637804	10.362196	9.683194	10.316806	10.045390	9.954610	30	2
59	45	9.637870	10.362130	9.683275	10.316725	10.045406	9.954594	15	1
60	45	9.637935	10.362065	9.683356	10.316644	10.045421	9.954579	15	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	4h 17m.		LOG. SINES, &c.				64 deg.		

1h 43m.			LOG. SINES, &c.				25 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	45	9.637935	10.362065	9.683356	10.316644	10.045421	9.954579	15	60
1	15	9.638000	10.362000	9.683436	10.316564	10.045436	9.954564	45	59
2	30	9.638066	10.361934	9.683517	10.316483	10.045451	9.954549	30	58
3	45	9.638131	10.361869	9.683598	10.316402	10.045466	9.954534	15	57
4	46	9.638197	10.361803	9.683678	10.316322	10.045482	9.954518	14	56
5	15	9.638262	10.361738	9.683759	10.316241	10.045497	9.954503	45	55
6	30	9.638328	10.361672	9.683840	10.316160	10.045512	9.954488	30	54
7	45	9.638393	10.361607	9.683920	10.316080	10.045527	9.954473	15	53
8	47	9.638458	10.361542	9.684001	10.315999	10.045543	9.954457	13	52
9	15	9.638524	10.361476	9.684082	10.315918	10.045558	9.954442	45	51
10	30	9.638589	10.361411	9.684162	10.315838	10.045573	9.954427	30	50
11	45	9.638655	10.361345	9.684243	10.315757	10.045588	9.954412	15	49
12	48	9.638720	10.361280	9.684324	10.315676	10.045604	9.954396	12	48
13	15	9.638785	10.361215	9.684404	10.315596	10.045619	9.954381	45	47
14	30	9.638851	10.361149	9.684485	10.315515	10 045634	9.954366	30	46
15	45	9.638916	10.361084	9.684565	10.315435	10.045650	9.954350	15	45
16	49	9.638981	10.361019	9.684646	10.315354	10.045665	9.954335	11	44
17	15	9.639046	10.360954	9.684726	10.315274	10.045680	9.954320	45	43
18	30	9.639112	10.360888	9.684807	10.315193	10.045695	9.954305	30	42
19	45	9.639177	10.360823	9.684888	10.315112	10.045711	9.954289	15	41
20	50	9.639242	10.360758	9.684968	10 315032	10.045726	9.954274	10	40
21	15	9.639307	10.360693	9.685049	10.314951	10.045741	9.954259	45	39
22	30	9.639373	10.360627	9.685129	10.314871	10.045757	9.954243	30	38
23	45	9.639438	10.360562	9.685210	10.314790	10.045772	9.954228	15	37
24	51	9.639503	10.360497	9.685290	10.314710	10.045787	9.954213	9	36
25	15	9.639568	10.360432	9.685371	10 314629	10.045802	9.954198	45	35
26	30	9.639633	10.360367	9.685451	10.314549	10.045818	9.954182	30	34
27	45	9.639698	10.360302	9.685532	10.314468	10.045833	9.954167	15	33
28	52	9.639764	10.360236	9.685612	10.314388	10.045848	9.954152	8	32
29	15	9.639829	10.360171	9.685692	10.314308	10.045864	9.954136	45	31
30	30	9.639894	10.360106	9.685773	10.314227	10.045879	9.954121	30	30
31	45	9.639959	10.360041	9.685853	10.314147	10.045894	9.954106	15	29
32	53	9.640024	10.359976	9.685934	10.314066	10.045910	9.954090	7	28
33	15	9.640089	10.359911	9.686014	10.313986	10.045925	9.954075	45	27
34	30	9.640154	10.359846	9.686095	10.313905	10.045940	9.954060	30	26
35	45	9.640219	10.359781	9.686175	10.313825	10.045956	9.954044	15	25
36	54	9.640284	10.359716	9.686255	10.313745	10.045971	9.954029	6	24
37	15	9.640349	10.359651	9.686336	10 313664	10.045986	9.954014	45	23
38	30	9.640414	10.359586	9.686416	10.313584	10.046002	9.953998	30	22
39	45	9.640479	10.359521	9.686496	10.313504	10.046017	9.953983	15	21
40	55	9.640544	10.359456	9.686577	10.313423	10.046032	9.953968	5	20
41	15	9.640609	10.359391	9.686657	10.313343	10.046048	9.953952	45	19
42	30	9.640674	10.359326	9.686737	10.313263	10.046063	9.953937	30	18
43	45	9.640739	10.359261	9.686818	10.313182	10.046078	9.953922	15	17
44	56	9.640804	10.359196	9.686898	10.313102	10.046094	9 953906	4	16
45	15	9.640869	10.359131	9.686978	10.313022	10.046109	9.953891	45	15
46	30	9.640934	10.359066	9.687059	10.312941	10.046124	9.953876	30	14
47	45	9.640999	10.359001	9.687139	10.312861	10.046140	9.953860	15	13
48	57	9.641064	10.358936	9.687219	10.312781	10.046155	9.953845	3	12
49	15	9.641129	10.358871	9.687299	10.312701	10.046171	9.953829	45	11
50	30	9.641194	10.358806	9.687380	10.312620	10.046186	9.953814	30	10
51	45	9.641259	10.358741	9.687460	10.312540	10.046201	9.953799	15	9
52	58	9.641323	10.358677	9.687540	10.312460	10.046217	9.953783	2	8
53	15	9.641388	10.358612	9.687620	10.312380	10.046232	9.953768	45	7
54	30	9.641453	10.358547	9.687701	10.312299	10.046247	9.953753	30	6
55	45	9.641518	10.358482	9.687781	10.312219	10.046263	9.953737	15	5
56	59	9.641583	10.358417	9.687861	10.312139	10.046278	9.953722	1	4
57	15	9.641648	10.358352	9.687941	10.312059	10.046294	9.953706	45	3
58	30	9 641712	10.358288	9.688021	10.311979	10.046309	9 953691	30	2
59	45	9.641777	10.358223	9.688102	10.311898	10.046324	9.953676	15	1
60	60	9.641842	10.358158	9.688182	10.311818	10.046340	9.953660	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
4h 16m.			LOG. SINES, &c.				64 deg.		

1h 44m.				LOG. SINES, &c.			26 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	0	9.641842	10.358158	9.688182	10.311818	10.046340	9.953660	60	60
1	15	9.641907	10.358093	9.688262	10.311738	10.046355	9.953645	45	59
2	30	9.641971	10.358029	9.688342	10.311658	10.046371	9.953629	30	58
3	45	9.642036	10.357964	9.688422	10.311578	10.046386	9.953614	15	57
4	1	9.642101	10.357899	9.688502	10.311498	10.046402	9.953598	59	56
5	15	9.642166	10.357834	9.688582	10.311418	10.046417	9.953583	45	55
6	30	9.642230	10.357770	9.688663	10.311337	10.046432	9.953568	30	54
7	45	9.642295	10.357705	9.688743	10.311257	10.046448	9.953552	14	53
8	2	9.642360	10.357640	9.688823	10.311177	10.046463	9.953537	58	52
9	15	9.642424	10.357576	9.688903	10.311097	10.046479	9.953521	45	51
10	30	9.642489	10.357511	9.688983	10.311017	10.046494	9.953506	30	50
11	45	9.642553	10.357447	9.689063	10.310937	10.046509	9.953491	15	49
12	3	9.642618	10.357382	9.689143	10.310857	10.046525	9.953475	57	48
13	15	9.642683	10.357317	9.689223	10.310777	10.046540	9.953460	45	47
14	30	9.642747	10.357253	9.689303	10.310697	10.046556	9.953444	30	46
15	45	9.642812	10.357188	9.689383	10.310617	10.046571	9.953429	15	45
16	4	9.642876	10.357124	9.689463	10.310537	10.046587	9.953413	56	44
17	15	9.642941	10.357059	9.689543	10.310457	10.046602	9.953398	45	43
18	30	9.643006	10.356994	9.689623	10.310377	10.046618	9.953382	30	42
19	45	9.643070	10.356930	9.689703	10.310297	10.046633	9.953367	15	41
20	5	9.643135	10.356865	9.689783	10.310217	10.046649	9.953351	55	40
21	15	9.643199	10.356801	9.689863	10.310137	10.046664	9.953336	45	39
22	30	9.643264	10.356736	9.689943	10.310057	10.046679	9.953321	30	38
23	45	9.643328	10.356672	9.690023	10.309977	10.046695	9.953305	15	37
24	6	9.643393	10.356607	9.690103	10.309897	10.046710	9.953290	54	36
25	15	9.643457	10.356543	9.690183	10.309817	10.046726	9.953274	45	35
26	30	9.643521	10.356479	9.690263	10.309737	10.046741	9.953259	30	34
27	45	9.643586	10.356414	9.690343	10.309657	10.046757	9.953243	15	33
28	7	9.643650	10.356350	9.690423	10.309577	10.046772	9.953228	53	32
29	15	9.643715	10.356285	9.690502	10.309498	10.046788	9.953212	45	31
30	30	9.643779	10.356221	9.690582	10.309418	10.046803	9.953197	30	30
31	45	9.643844	10.356156	9.690662	10.309338	10.046819	9.953181	15	29
32	8	9.643908	10.356092	9.690742	10.309258	10.046834	9.953166	52	28
33	15	9.643972	10.356028	9.690822	10.309178	10.046850	9.953150	45	27
34	30	9.644037	10.355963	9.690902	10.309098	10.046865	9.953135	30	26
35	45	9.644101	10.355899	9.690982	10.309018	10.046881	9.953119	15	25
36	9	9.644165	10.355835	9.691062	10.308938	10.046896	9.953104	51	24
37	15	9.644230	10.355770	9.691141	10.308859	10.046912	9.953088	45	23
38	30	9.644294	10.355706	9.691221	10.308779	10.046927	9.953073	30	22
39	45	9.644358	10.355642	9.691301	10.308699	10.046943	9.953057	15	21
40	10	9.644423	10.355577	9.691381	10.308619	10.046958	9.953042	50	20
41	15	9.644487	10.355513	9.691461	10.308539	10.046974	9.953026	45	19
42	30	9.644551	10.355449	9.691540	10.308460	10.046989	9.953011	30	18
43	45	9.644615	10.355385	9.691620	10.308380	10.047005	9.952995	15	17
44	11	9.644680	10.355320	9.691700	10.308300	10.047020	9.952980	49	16
45	15	9.644744	10.355256	9.691780	10.308220	10.047036	9.952964	45	15
46	30	9.644808	10.355192	9.691859	10.308141	10.047051	9.952949	30	14
47	45	9.644872	10.355128	9.691939	10.308061	10.047067	9.952933	15	13
48	12	9.644936	10.355064	9.692019	10.307981	10.047083	9.952917	48	12
49	15	9.645001	10.354999	9.692099	10.307901	10.047098	9.952902	45	11
50	30	9.645065	10.354935	9.692178	10.307822	10.047114	9.952886	30	10
51	45	9.645129	10.354871	9.692258	10.307742	10.047129	9.952871	15	9
52	13	9.645193	10.354807	9.692338	10.307662	10.047145	9.952855	47	8
53	15	9.645257	10.354743	9.692417	10.307583	10.047160	9.952840	45	7
54	30	9.645321	10.354679	9.692497	10.307503	10.047176	9.952824	30	6
55	45	9.645385	10.354615	9.692577	10.307423	10.047191	9.952809	15	5
56	14	9.645450	10.354550	9.692656	10.307344	10.047207	9.952793	46	4
57	15	9.645514	10.354486	9.692736	10.307264	10.047223	9.952777	45	3
58	30	9.645578	10.354422	9.692816	10.307184	10.047238	9.952762	30	2
59	45	9.645642	10.354358	9.692895	10.307105	10.047254	9.952746	15	1
60	15	9.645706	10.354294	9.692975	10.307025	10.047269	9.952731	45	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
4h 15m.				LOG. SINES, &c.			63 deg.		

1h 45m.		LOG. SINES, &c.					26 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	15	9.645706	10.354294	9.692975	10.307025	10.047269	9.952731	45	60
1	15	9.645770	10.354230	9.693055	10.306945	10.047285	9.952715	45	59
2	30	9.645834	10.354166	9.693134	10.306866	10.047300	9.952700	30	58
3	45	9.645898	10.354102	9.693214	10.306786	10.047316	9.952684	15	57
4	16	9.645962	10.354038	9.693293	10.306707	10.047332	9.952668	44	56
5	15	9.646026	10.353974	9.693373	10.306627	10.047347	9.952653	45	55
6	30	9.646090	10.353910	9.693453	10.306547	10.047363	9.952637	30	54
7	45	9.646154	10.353846	9.693532	10.306468	10.047378	9.952622	15	53
8	17	9.646218	10.353782	9.693612	10.306388	10.047394	9.952606	43	52
9	15	9.646282	10.353718	9.693691	10.306309	10.047410	9.952590	45	51
10	30	9.646346	10.353654	9.693771	10.306229	10.047425	9.952575	30	50
11	45	9.646410	10.353590	9.693850	10.306150	10.047441	9.952559	15	49
12	18	9.646473	10.353527	9.693930	10.306070	10.047456	9.952544	42	48
13	15	9.646537	10.353463	9.694009	10.305991	10.047472	9.952528	45	47
14	30	9.646601	10.353399	9.694089	10.305911	10.047488	9.952512	30	46
15	45	9.646665	10.353335	9.694168	10.305832	10.047503	9.952497	15	45
16	19	9.646729	10.353271	9.694248	10.305752	10.047519	9.952481	41	44
17	15	9.646793	10.353207	9.694327	10.305673	10.047534	9.952466	45	43
18	30	9.646857	10.353143	9.694407	10.305593	10.047550	9.952450	30	42
19	45	9.646920	10.353080	9.694486	10.305514	10.047566	9.952434	15	41
20	20	9.646984	10.353016	9.694566	10.305434	10.047581	9.952419	40	40
21	15	9.647048	10.352952	9.694645	10.305355	10.047597	9.952403	45	39
22	30	9.647112	10.352888	9.694724	10.305276	10.047613	9.952387	30	38
23	45	9.647176	10.352824	9.694804	10.305196	10.047628	9.952372	15	37
24	21	9.647239	10.352761	9.694883	10.305117	10.047644	9.952356	39	36
25	15	9.647303	10.352697	9.694963	10.305037	10.047659	9.952341	45	35
26	30	9.647367	10.352633	9.695042	10.304958	10.047675	9.952325	30	34
27	45	9.647431	10.352569	9.695121	10.304879	10.047691	9.952309	15	33
28	22	9.647494	10.352506	9.695201	10.304799	10.047706	9.952294	38	32
29	15	9.647558	10.352442	9.695280	10.304720	10.047722	9.952278	45	31
30	30	9.647622	10.352378	9.695360	10.304640	10.047738	9.952262	30	30
31	45	9.647686	10.352314	9.695439	10.304561	10.047753	9.952247	15	29
32	23	9.647749	10.352251	9.695518	10.304482	10.047769	9.952231	37	28
33	15	9.647813	10.352187	9.695598	10.304402	10.047785	9.952215	45	27
34	30	9.647877	10.352123	9.695677	10.304323	10.047800	9.952200	30	26
35	45	9.647940	10.352060	9.695756	10.304244	10.047816	9.952184	15	25
36	24	9.648004	10.351996	9.695835	10.304165	10.047832	9.952168	36	24
37	15	9.648067	10.351933	9.695915	10.304085	10.047847	9.952153	45	23
38	30	9.648131	10.351869	9.695994	10.304006	10.047863	9.952137	30	22
39	45	9.648195	10.351805	9.696073	10.303927	10.047879	9.952121	15	21
40	25	9.648258	10.351742	9.696153	10.303847	10.047895	9.952105	35	20
41	15	9.648322	10.351678	9.696232	10.303768	10.047910	9.952090	45	19
42	30	9.648385	10.351615	9.696311	10.303689	10.047926	9.952074	30	18
43	45	9.648449	10.351551	9.696390	10.303610	10.047942	9.952058	15	17
44	26	9.648512	10.351488	9.696470	10.303530	10.047957	9.952043	34	16
45	15	9.648576	10.351424	9.696549	10.303451	10.047973	9.952027	45	15
46	30	9.648639	10.351361	9.696628	10.303372	10.047989	9.952011	30	14
47	45	9.648703	10.351297	9.696707	10.303293	10.048004	9.951996	15	13
48	27	9.648766	10.351234	9.696786	10.303214	10.048020	9.951980	33	12
49	15	9.648830	10.351170	9.696866	10.303134	10.048036	9.951964	45	11
50	30	9.648893	10.351107	9.696945	10.303055	10.048052	9.951948	30	10
51	45	9.648957	10.351043	9.697024	10.302976	10.048067	9.951933	15	9
52	28	9.649020	10.350980	9.697103	10.302897	10.048083	9.951917	32	8
53	15	9.649084	10.350916	9.697182	10.302818	10.048099	9.951901	45	7
54	30	9.649147	10.350853	9.697261	10.302739	10.048114	9.951886	30	6
55	45	9.649211	10.350789	9.697341	10.302659	10.048130	9.951870	15	5
56	29	9.649274	10.350726	9.697420	10.302580	10.048146	9.951854	31	4
57	15	9.649337	10.350663	9.697499	10.302501	10.048162	9.951838	45	3
58	30	9.649401	10.350599	9.697578	10.302422	10.048177	9.951823	30	2
59	45	9.649464	10.350536	9.697657	10.302343	10.048193	9.951807	15	1
60	30	9.649527	10.350473	9.697736	10.302264	10.048209	9.951791	30	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
4h 14m.				LOG. SINES, &c.				63 deg.	

1h 46m.		LOG. SINES, &c.					26 deg.		
sec	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″	sec.
0	30	9.649527	10.350473	9.697736	10.302264	10.048209	9.951791	30	60
1	15	9.649591	10.350409	9.697815	10.302185	10.048225	9.951775	45	59
2	30	9.649654	10.350346	9.697894	10.302106	10.048240	9.951760	30	58
3	45	9.649717	10.350283	9.697973	10.302027	10.048256	9.951744	15	57
4	31	9.649781	10.350219	9.698053	10.301947	10.048272	9.951728	29	56
5	15	9.649844	10.350156	9.698132	10.301868	10.048288	9.951712	45	55
6	30	9.649907	10.350093	9.698211	10.301789	10.048303	9.951697	30	54
7	45	9.649971	10.350029	9.698290	10.301710	10.048319	9.951681	15	53
8	32	9.650034	10.349966	9.698369	10.301631	10.048335	9.951665	28	52
9	15	9.650097	10.349903	9.698448	10.301552	10.048351	9.951649	45	51
10	30	9.650160	10.349840	9.698527	10.301473	10.048366	9.951634	30	50
11	45	9.650223	10.349777	9.698606	10.301394	10.048382	9.951618	15	49
12	33	9.650287	10.349713	9.698685	10.301315	10.048398	9.951602	27	48
13	15	9.650350	10.349650	9.698764	10.301236	10.048414	9.951586	45	47
14	30	9.650413	10.349587	9.698843	10.301157	10.048430	9.951570	30	46
15	45	9.650476	10.349524	9.698922	10.301078	10.048445	9.951555	15	45
16	34	9.650539	10.349461	9.699001	10.300999	10.048461	9.951539	26	44
17	15	9.650603	10.349397	9.699080	10.300920	10.048477	9.951523	45	43
18	30	9.650666	10.349334	9.699158	10.300842	10.048493	9.951507	30	42
19	45	9.650729	10.349271	9.699237	10.300763	10.048509	9.951491	15	41
20	35	9.650792	10.349208	9.699316	10.300684	10.048524	9.951476	25	40
21	15	9.650855	10.349145	9.699395	10.300605	10.048540	9.951460	45	39
22	30	9.650918	10.349082	9.699474	10.300526	10.048556	9.951444	30	38
23	45	9.650981	10.349019	9.699553	10.300447	10.048572	9.951428	15	37
24	36	9.651044	10.348956	9.699632	10.300368	10.048588	9.951412	24	36
25	15	9.651107	10.348893	9.699711	10.300289	10.048603	9.951397	45	35
26	30	9.651170	10.348830	9.699790	10.300210	10.048619	9.951381	30	34
27	45	9.651234	10.348766	9.699869	10.300131	10.048635	9.951365	15	33
28	37	9.651297	10.348703	9.699947	10.300053	10.048651	9.951349	23	32
29	15	9.651360	10.348640	9.700026	10.299974	10 048667	9.951333	45	31
30	30	9.651423	10.348577	9.700105	10.299895	10.048683	9.951317	30	30
31	45	9.651486	10.348514	9.700184	10.299816	10.048698	9.951302	15	29
32	38	9.651549	10.348451	9.700263	10.299737	10.048714	9.951286	22	28
33	15	9.651612	10.348388	9.700342	10.299658	10.048730	9.951270	45	27
34	30	9.651674	10.348326	9.700420	10.299580	10.048746	9.951254	30	26
35	45	9.651737	10.348263	9.700499	10.299501	10.048762	9.951238	15	25
36	39	9.651800	10.348200	9.700578	10.299422	10.048778	9.951222	21	24
37	15	9.651863	10.348137	9.700657	10.299343	10.048793	9.951207	45	23
38	30	9.651926	10.348074	9.700735	10.299265	10.048809	9.951191	30	22
39	45	9.651989	10.348011	9.700814	10.299186	10.048825	9.951175	15	21
40	40	9.652052	10.347948	9.700893	10.299107	10.048841	9.951159	20	20
41	15	9.652115	10.347885	9.700972	10.299028	10.048857	9.951143	45	19
42	30	9.652178	10.347822	9.701050	10.298950	10.048873	9.951127	30	18
43	45	9.652241	10.347759	9.701129	10.298871	10.048889	9.951111	15	17
44	41	9.652303	10.347697	9.701208	10.298792	10.048904	9.951096	19	16
45	15	9.652366	10.347634	9.701287	10.298713	10.048920	9.951080	45	15
46	30	9.652429	10.347571	9.701365	10.298635	10.048936	9.951064	30	14
47	45	9.652492	10.347508	9.701444	10.298556	10.048952	9.951048	15	13
48	42	9.652555	10.347445	9.701523	10.298477	10.048968	9.951032	18	12
49	15	9.652618	10.347382	9.701601	10.298399	10.048984	9.951016	45	11
50	30	9.652680	10.347320	9.701680	10.298320	10.049000	9.951000	30	10
51	45	9.652743	10.347257	9.701759	10.298241	10.049016	9.950984	15	9
52	43	9.652806	10.347194	9.701837	10.298163	10.049032	9.950968	17	8
53	15	9.652869	10.347131	9.701916	10.298084	10.049047	9.950953	45	7
54	30	9.652931	10.347069	9.701995	10.298005	10.049063	9.950937	30	6
55	45	9.652994	10.347006	9.702073	10.297927	10.049079	9.950921	15	5
56	44	9.653057	10.346943	9 702152	10.297848	10.049095	9.950905	16	4
57	15	9.653119	10.346881	9.702230	10.297770	10.049111	9.950889	45	3
58	30	9.653182	10.346818	9.702309	10.297691	10.049127	9.950873	30	2
59	45	9.653245	10.346755	9.702388	10.297612	10.049143	9.950857	15	1
60	45	9.653307	10.346693	9.702466	10.297534	10.049159	9.950841	15	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
4h 13m.		LOG. SINES, &c.					63 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	$1^h\ 47^m$.		LOG. SINES, &c.				26 deg.		
0	45	9.653307	10.346693	9.702466	10.297534	10.049159	9.950841	15	60
1	15	9.653370	10.346630	9.702545	10.297455	10.049175	9.950825	45	59
2	30	9.653433	10.346567	9.702623	10.297377	10.049191	9.950809	30	58
3	45	9.653495	10.346505	9.702702	10.297298	10.049207	9.950793	15	57
4	46	9.653558	10.346442	9.702780	10.297220	10.049223	9.950777	14	56
5	15	9.653621	10.346379	9.702859	10.297141	10.049238	9.950762	45	55
6	30	9.653683	10.346317	9.702938	10.297062	10.049254	9.950746	30	54
7	45	9.653746	10.346254	9.703016	10.296984	10.049270	9.950730	15	53
8	47	9.653808	10.346192	9.703095	10.296905	10.049286	9.950714	13	52
9	15	9.653871	10.346129	9.703173	10.296827	10.049302	9.950698	45	51
10	30	9.653933	10.346067	9.703252	10.296748	10.049318	9.950682	30	50
11	45	9.653996	10.346004	9.703330	10.296670	10.049334	9.950666	15	49
12	48	9.654059	10.345941	9.703409	10.296591	10.049350	9.950650	12	48
13	15	9.654121	10.345879	9.703487	10.296513	10.049366	9.950634	45	47
14	30	9.654184	10.345816	9.703566	10.296434	10.049382	9.950618	30	46
15	45	9.654246	10.345754	9.703644	10.296356	10.049398	9.950602	15	45
16	49	9.654309	10.345691	9.703722	10.296278	10.049414	9.950586	11	44
17	15	9.654371	10.345629	9.703801	10.296199	10.049430	9.950570	45	43
18	30	9.654433	10.345567	9.703879	10.296121	10.049446	9.950554	30	42
19	45	9.654496	10.345504	9.703958	10.296042	10.049462	9.950538	15	41
20	50	9.654558	10.345442	9.704036	10.295964	10.049478	9.950522	10	40
21	15	9.654621	10.345379	9.704115	10.295885	10.049494	9.950506	45	39
22	30	9.654683	10.345317	9.704193	10.295807	10.049510	9.950490	30	38
23	45	9.654746	10.345254	9.704271	10.295729	10.049526	9.950474	15	37
24	51	9.654808	10.345192	9.704350	10.295650	10.049542	9.950458	9	36
25	15	9.654870	10.345130	9.704428	10.295572	10.049558	9.950442	45	35
26	30	9.654933	10.345067	9.704506	10.295494	10.049574	9.950426	30	34
27	45	9.654995	10.345005	9.704585	10.295415	10.049590	9.950410	15	33
28	52	9.655057	10.344943	9.704663	10.295337	10.049606	9.950394	8	32
29	15	9.655120	10.344880	9.704741	10.295259	10.049622	9.950378	45	31
30	30	9.655182	10.344818	9.704820	10.295180	10.049638	9.950362	30	30
31	45	9.655244	10.344756	9.704898	10.295102	10.049654	9.950346	15	29
32	53	9.655307	10.344693	9.704976	10.295024	10.049670	9.950330	7	28
33	15	9.655369	10.344631	9.705055	10.294945	10.049686	9.950314	45	27
34	30	9.655431	10.344569	9.705133	10.294867	10.049702	9.950298	30	26
35	45	9.655494	10.344506	9.705211	10.294789	10.049718	9.950282	15	25
36	54	9.655556	10.344444	9.705290	10.294710	10.049734	9.950266	6	24
37	15	9.655618	10.344382	9.705368	10.294632	10.049750	9.950250	45	23
38	30	9.655680	10.344320	9.705446	10.294554	10.049766	9.950234	30	22
39	45	9.655743	10.344257	9.705524	10.294476	10.049782	9.950218	15	21
40	55	9.655805	10.344195	9.705603	10.294397	10.049798	9.950202	5	20
41	15	9.655867	10.344133	9.705681	10.294319	10.049814	9.950186	45	19
42	30	9.655929	10.344071	9.705759	10.294241	10.049830	9.950170	30	18
43	45	9.655991	10.344009	9.705837	10.294163	10.049846	9.950154	15	17
44	56	9.656054	10.343946	9.705916	10.294084	10.049862	9.950138	4	16
45	15	9.656116	10.343884	9.705994	10.294006	10.049878	9.950122	45	15
46	30	9.656178	10.343822	9.706072	10.293928	10.049894	9.950106	30	14
47	45	9.656240	10.343760	9.706150	10.293850	10.049910	9.950090	15	13
48	57	9.656302	10.343698	9.706228	10.293772	10.049926	9.950074	3	12
49	15	9.656364	10.343636	9.706306	10.293694	10.049942	9.950058	45	11
50	30	9.656426	10.343574	9.706385	10.293615	10.049958	9.950042	30	10
51	45	9.656488	10.343512	9.706463	10.293537	10.049974	9.950026	15	9
52	58	9.656550	10.343450	9.706541	10.293459	10.049991	9.950009	2	8
53	15	9.656613	10.343387	9.706619	10.293381	10.050007	9.949993	45	7
54	30	9.656675	10.343325	9.706697	10.293303	10.050023	9.949977	30	6
55	45	9.656737	10.343263	9.706775	10.293225	10.050039	9.949961	15	5
56	59	9.656799	10.343201	9.706853	10.293147	10.050055	9.949945	1	4
57	15	9.656861	10.343139	9.706932	10.293068	10.050071	9.949929	45	3
58	30	9.656923	10.343077	9.707010	10.292990	10.050087	9.949913	30	2
59	45	9.656985	10.343015	9.707088	10.292912	10.050103	9.949897	15	1
60	60	9.657047	10.342953	9.707166	10.292834	10.050119	9.949881	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$4^h\ 12^m$.		LOG. SINES, &c.				63 deg.		

1h 48m.			LOG. SINES, &c.				27 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	0	9.657047	10.342953	9.707166	10.292834	10.050119	9.949881	60	60
1	15	9.657109	10.342891	9.707244	10.292756	10.050135	9.949865	45	59
2	30	9.657171	10.342829	9.707322	10.292678	10.050151	9.949849	30	58
3	45	9.657233	10.342767	9.707400	10.292600	10.050167	9.949833	15	57
4	1	9.657295	10.342705	9.707478	10.292522	10.050184	9.949816	59	56
5	15	9.657356	10.342644	9.707556	10.292444	10.050200	9.949800	45	55
6	30	9.657418	10.342582	9.707634	10.292366	10.050216	9.949784	30	54
7	45	9.657480	10.342520	9.707712	10.292288	10.050232	9.949768	15	53
8	2	9.657542	10.342458	9.707790	10.292210	10.050248	9.949752	58	52
9	15	9.657604	10.342396	9.707868	10.292132	10.050264	9.949736	45	51
10	30	9.657666	10.342334	9.707946	10.292054	10.050280	9.949720	30	50
11	45	9.657728	10.342272	9.708024	10.291976	10.050296	9.949704	15	49
12	3	9.657790	10.342210	9.708102	10.291898	10.050312	9.949688	57	48
13	15	9.657852	10.342148	9.708180	10.291820	10.050329	9.949671	45	47
14	30	9.657913	10.342087	9.708258	10.291742	10 050345	9.949655	30	46
15	45	9.657975	10 342025	9.708336	10.291664	10.050361	9.949639	15	45
16	4	9.658037	10.341963	9.708414	10.291586	10.050377	9.949623	56	44
17	15	9.658099	10.341901	9.708492	10.291508	10.050393	9.949607	45	43
18	30	9.658161	10.341839	9.708570	10.291430	10.050409	9.949591	30	42
19	45	9.658222	10.341778	9.708648	10.291352	10.050425	9.949575	15	41
20	5	9.658284	10 341716	9.708726	10.291274	10.050442	9.949558	55	40
21	15	9.658346	10.341654	9.708804	10.291196	10.050458	9.949542	45	39
22	30	9.658408	10.341592	9.708882	10.291118	10.050474	9.949526	30	38
23	45	9.658469	10 341531	9.708959	10.291041	10.050490	9.949510	15	37
24	6	9.658531	10.341469	9.709037	10.290963	10 050506	9.949494	54	36
25	15	9.658593	10.341407	9.709115	10.290885	10 050522	9.949478	45	35
26	30	9.658655	10.341345	9.709193	10.290807	10.050539	9.949461	30	34
27	45	9.658716	10.341284	9.709271	10.290729	10.050555	9.949445	15	33
28	7	9.658778	10.341222	9.709349	10.290651	10.050571	9.949429	53	32
29	15	9.658840	10.341160	9.709427	10 290573	10.050587	9 949413	45	31
30	30	9.658901	10.341099	9.709504	10.290496	10.050603	9.949397	30	30
31	45	9.658963	10.341037	9.709582	10.290418	10.050619	9.949381	15	29
32	8	9.659025	10.340975	9.709660	10.290340	10.050636	9.949364	52	28
33	15	9.659086	10.340914	9 709738	10.290262	10.050652	9 949348	45	27
34	30	9.659148	10 340852	9.709816	10.290184	10.050668	9.949332	30	26
35	45	9.659209	10.340791	9.709893	10.290107	10.050684	9.949316	15	25
36	9	9.659271	10.340729	9.709971	10.290029	10.050700	9.949300	51	24
37	15	9.659333	10.340667	9.710049	10.289951	10.050717	9.949283	45	23
38	30	9 659394	10.340606	9.710127	10.289873	10.050733	9.949267	30	22
39	45	9.659456	10.340544	9.710205	10.289795	10.050749	9.949251	15	21
40	10	9.659517	10.340483	9.710282	10.289718	10.050765	9.949235	50	20
41	15	9 659579	10.340421	9.710360	10.289640	10.050781	9.949219	45	19
42	30	9.659640	10.340360	9.710438	10.289562	10.050798	9.949202	30	18
43	45	9.659702	10.340298	9.710516	10.289484	10.050814	9 949186	15	17
44	11	9.659763	10.340237	9.710593	10.289407	10.050830	9.949170	49	16
45	15	9.659825	10.340175	9.710671	10.289329	10.050846	9.949154	45	15
46	30	9.659886	10.340114	9.710749	10.289251	10.050862	9.949138	30	14
47	45	9.659948	10.340052	9.710826	10.289174	10 050879	9.949121	15	13
48	12	9.660009	10.339991	9.710904	10.289096	10.050895	9.949105	48	12
49	15	9.660071	10.339929	9.710982	10.289018	10.050911	9.949089	45	11
50	30	9.660132	10.339868	9.711059	10.288941	10.050927	9.949073	30	10
51	45	9.660194	10 339806	9.711137	10.288863	10.050944	9.949056	15	9
52	13	9.660255	10.339745	9.711215	10.288785	10 050960	9.949040	47	8
53	15	9.660316	10 339684	9.711292	10.288708	10.050976	9.949024	45	7
54	30	9.660378	10 339622	9.711370	10.288630	10.050992	9.949008	30	6
55	45	9.660439	10 339561	9.711448	10.288552	10.051009	9.948991	15	5
56	14	9.660500	10.339500	9.711525	10.288475	10.051025	9.948975	46	4
57	15	9.660562	10.339438	9.711603	10.288397	10.051041	9.948959	45	3
58	30	9.660623	10.339377	9.711681	10.288319	10.051057	9.948943	30	2
59	45	9.660685	10.339315	9.711758	10.288242	10.051074	9.948926	15	1
60	15	9.660746	10.339254	9.711836	10.288164	10.051090	9.948910	45	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
4h 11m.			LOG. SINES, &c.				62 deg.		

1h 49m.			LOG. SINES, &c.				27 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	15	9.660746	10.339254	9.711836	10.288164	10.051090	9.948910	45	60
1	15	9.660807	10.339193	9.711913	10.288087	10.051106	9.948894	45	59
2	30	9.660868	10.339132	9.711991	10.288009	10.051122	9.948878	30	58
3	45	9.660930	10.339070	9.712068	10.287932	10.051139	9.948861	15	57
4	16	9.660991	10.339009	9.712146	10.287854	10.051155	9.948845	44	56
5	15	9.661052	10.338948	9.712224	10.287776	10.051171	9.948829	45	55
6	30	9.661114	10.338886	9.712301	10.287699	10.051188	9.948812	30	54
7	45	9.661175	10.338825	9.712379	10.287621	10.051204	9.948796	15	53
8	17	9.661236	10.338764	9.712456	10.287544	10.051220	9.948780	43	52
9	15	9.661297	10.338703	9.712534	10.287466	10.051236	9.948764	45	51
10	30	9.661359	10.338641	9.712611	10.287389	10.051253	9.948747	30	50
11	45	9.661420	10 338580	9.712689	10.287311	10 051269	9.948731	15	49
12	18	9.661481	10.338519	9.712766	10.287234	10.051285	9.948715	42	48
13	15	9.661542	10.338458	9.712844	10.287156	10.051302	9.948698	45	47
14	30	9.661603	10.338397	9.712921	10.287079	10.051318	9.948682	30	46
15	45	9.661664	10.338336	9.712999	10.287001	10.051334	9.948666	15	45
16	19	9.661726	10 338274	9.713076	10.286924	10.051351	9.948649	41	44
17	15	9.661787	10.338213	9.713154	10.286846	10.051367	9.948633	45	43
18	30	9.661848	10.338152	9.713231	10.286769	10.051383	9.948617	30	42
19	45	9.661909	10.338091	9.713308	10.286692	10.051399	9.948601	15	41
20	20	9.661970	10.338030	9.713386	10.286614	10.051416	9.948584	40	40
21	15	9.662031	10.337969	9.713463	10.286537	10.051432	9.948568	45	39
22	30	9.662092	10.337908	9.713541	10.286459	10.051448	9.948552	30	38
23	45	9 662153	10.337847	9.713618	10.286382	10.051465	9.948535	15	37
24	21	9 662214	10.337786	9.713696	10.286304	10.051481	9.948519	39	36
25	15	9 662275	10.337725	9.713773	10.286227	10.051497	9.948503	45	35
26	30	9.662337	10.337663	9.713850	10.286150	10.051514	9.948486	30	34
27	45	9.662398	10.337602	9.713928	10.286072	10.051530	9.948470	15	33
28	22	9 662459	10.337541	9.714005	10.285995	10.051547	9.948453	38	32
29	15	9.662520	10.337480	9.714082	10.285918	10.051563	9.948437	45	31
30	30	9.662581	10.337419	9.714160	10.285840	10.051579	9.948421	30	30
31	45	9.662642	10.337358	9.714237	10.285763	10.051596	9.948404	15	29
32	23	9.662703	10.337297	9.714314	10.285686	10.051612	9.948388	37	28
33	15	9.662764	10.337236	9.714392	10.285608	10.051628	9.948372	45	27
34	30	9.662824	10.337176	9.714469	10.285531	10.051645	9.948355	30	26
35	45	9.662885	10.337115	9.714546	10.285454	10.051661	9.948339	15	25
36	24	9.662946	10.337054	9.714624	10.285376	10.051677	9 948323	36	24
37	15	9.663007	10.336993	9.714701	10.285299	10.051694	9.948306	45	23
38	30	9.663068	10.336932	9.714778	10.285222	10.051710	9.948290	30	22
39	45	9.663129	10.336871	9.714856	10.285144	10.051727	9.948273	15	21
40	25	9.663190	10.336810	9.714933	10.285067	10.051743	9.948257	35	20
41	15	9.663251	10.336749	9.715010	10.284990	10.051759	9.948241	45	19
42	30	9.663312	10.336688	9.715087	10.284913	10.051776	9.948224	30	18
43	45	9.663373	10.336627	9.715165	10.284835	10.051792	9.948208	15	17
44	26	9.663433	10.336567	9.715242	10.284758	10.051808	9.948192	34	16
45	15	9.663494	10.336506	9.715319	10.284681	10.051825	9.948175	45	15
46	30	9.663555	10.336445	9.715396	10.284604	10.051841	9.948159	30	14
47	45	9.663616	10.336384	9.715474	10.284526	10.051858	9.948142	15	13
48	27	9.663677	10.336323	9.715551	10.284449	10.051874	9.948126	33	12
49	15	9.663738	10.336262	9.715628	10.284372	10 051890	9.948110	45	11
50	30	9.663798	10.336202	9.715705	10.284295	10.051907	9.948093	30	10
51	45	9.663859	10.336141	9.715782	10.284218	10.051923	9.948077	15	9
52	28	9.663920	10.336080	9.715859	10.284141	10.051940	9.948060	32	8
53	15	9.663981	10.336019	9.715937	10.284063	10.051956	9 948044	45	7
54	30	9.664041	10.335959	9.716014	10.283986	10.051973	9.948027	30	6
55	45	9.664102	10.335898	9.716091	10.283909	10.051989	9.948011	15	5
56	29	9.664163	10.335837	9.716168	10.283832	10.052005	9.947995	31	4
57	15	9.664223	10.335777	9.716245	10.283755	10.052022	9.947978	45	3
58	30	9.664284	10.335716	9.716322	10.283678	10.052038	9.947962	30	2
59	45	9.664345	10.335655	9.716400	10.283600	10.052055	9.947945	15	1
60	30	9.664406	10.335594	9.716477	10.283523	10.052071	9.947929	30	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
4h 10m.			LOG. SINES, &c.				62 deg.		

1h 50m.			LOG. SINES, &c.			27 deg.			
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	30	9.664406	10.335594	9.716477	10.283523	10.052671	9.947929	30	60
1	15	9.664466	10.335534	9.716554	10.283446	10.052086	9.947912	45	59
2	30	9.664527	10.335473	9.716631	10.283369	10.052104	9.947896	30	58
3	45	9.664586	10.335412	9.716708	10.283292	10.052120	9.947880	15	57
4	31	9.664648	10.335352	9.716785	10.283215	10.052137	9.947863	29	56
5	15	9.664709	10.335291	9.716862	10.283138	10.052153	9.947847	45	55
6	30	9.664769	10.335231	9.716939	10.283061	10.052170	9.947830	30	54
7	45	9.664830	10.335170	9.717016	10.282984	10.052186	9.947814	15	53
8	32	9.664891	10.335109	9.717093	10.282907	10.052203	9.947797	28	52
9	15	9.664951	10.335049	9.717170	10.282830	10.052219	9.947781	45	51
10	30	9.665012	10.334988	9.717247	10.282753	10.052236	9.947764	30	50
11	45	9.665072	10.334928	9.717324	10.282676	10.052252	9.947748	15	49
12	33	9.665133	10 334867	9.717401	10.282599	10.052269	9.947731	27	48
13	15	9.665193	10.334807	9.717478	10.282522	10.052285	9.947715	45	47
14	30	9.665254	10.334746	9.717555	10.282445	10.052302	9.947698	30	46
15	45	9.665314	10.334686	9.717632	10.282368	10.052318	9.947682	15	45
16	34	9.665375	10.334625	9.717709	10.282291	10.052335	9.947665	26	44
17	15	9.665435	10.334565	9.717786	10.282214	10.052351	9.947649	45	43
18	30	9.665496	10.334504	9.717863	10.282137	10.052368	9.947632	30	42
19	45	9.665556	10.334444	9.717940	10.282060	10.052384	9.947616	15	41
20	35	9.665617	10.334383	9.718017	10.281983	10.052401	9.947599	25	40
21	15	9.665677	10.334323	9.718094	10.281906	10.052417	9.947583	45	39
22	30	9.665738	10.334262	9.718171	10.281829	10.052434	9.947566	30	38
23	45	9.665798	10.334202	9.718248	10.281752	10.052450	9.947550	15	37
24	36	9.665859	10.334141	9.718325	10.281675	10.052467	9.947533	24	36
25	15	9.665919	10.334081	9.718402	10.281598	10.052483	9.947517	45	35
26	30	9.665979	10.334021	9.718479	10.281521	10.052500	9.947500	30	34
27	45	9.666040	10.333960	9.718556	10.281444	10.052516	9.947484	15	33
28	37	9 666100	10.333900	9.718633	10.281367	10.052533	9.947467	23	32
29	15	9.666160	10.333840	9.718710	10.281290	10.052549	9.947451	45	31
30	30	9.666221	10.333779	9.718786	10.281214	10.052566	9.947434	30	30
31	45	9.666281	10.333719	9.718863	10.281137	10.052582	9.947418	15	29
32	38	9.666341	10.333659	9.718940	10.281060	10.052599	9.947401	22	28
33	15	9.666402	10.333598	9.719017	10.280983	10.052615	9.947385	45	27
34	30	9.666462	10.333538	9.719094	10.280906	10.052632	9.947368	30	26
35	45	9.666522	10.333478	9.719171	10.280829	10.052648	9.947352	15	25
36	39	9.666583	10.333417	9.719248	10.280752	10.052665	9.947335	21	24
37	15	9.666643	10.333357	9.719324	10.280676	10.052681	9.947319	45	23
38	30	9.666703	10.333297	9.719401	10.280599	10.052698	9.947302	30	22
39	45	9.666764	10.333236	9.719478	10.280522	10.052715	9.947285	15	21
40	40	9.666824	10.333176	9.719555	10.280445	10.052731	9.947269	20	20
41	15	9.666884	10.333116	9.719632	10.280368	10.052748	9.947252	45	19
42	30	9.666944	10.333056	9.719708	10.280292	10.052764	9.947236	30	18
43	45	9.667004	10.332996	9.719785	10.280215	10.052781	9.947219	15	17
44	41	9.667065	10.332935	9.719862	10.280138	10.052797	9.947203	19	16
45	15	9.667125	10.332875	9.719939	10.280061	10.052814	9.947186	45	15
46	30	9.667185	10.332815	9.720015	10.279985	10.052831	9.947169	30	14
47	45	9.667245	10.332755	9.720092	10.279908	10.052847	9.947153	15	13
48	42	9.667305	10.332695	9.720169	10.279831	10.052864	9.947136	18	12
49	15	9 667366	10.332634	9.720246	10.279754	10.052880	9.947120	45	11
50	30	9.667426	10.332574	9.720322	10.279678	10.052897	9.947103	30	10
51	45	9.667486	10.332514	9.720399	10.279601	10.052913	9.947087	15	9
52	43	9.667546	10.332454	9.720476	10.279524	10.052930	9.947070	17	8
53	15	9.667606	10.332394	9.720553	10.279447	10.052947	9.947053	45	7
54	30	9.667666	10.332334	9.720629	10.279371	10.052963	9.947037	30	6
55	45	9.667726	10.332274	9.720706	10.279294	10.052980	9.947020	15	5
56	44	9.667786	10.332214	9.720783	10.279217	10.052996	9.947004	16	4
57	15	9.667846	10.332154	9.720859	10.279141	10.053013	9.946987	45	3
58	30	9.667906	10.332094	9.720936	10.279064	10.053030	9.946970	30	2
59	45	9.667966	10.332034	9.721013	10.278987	10.053046	9.946954	15	1
60	45	9.668026	10.331974	9.721089	10.278911	10.053063	9.946937	15	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
4h 9m.			LOG. SINES, &c.			62 deg.			

1h 51m.			LOG. SINES, &c.				27 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine	″ ′	sec.
0	45	9.668026	10.331974	9.721089	10.278911	10.053063	9.946937	15	60
1	15	9.668086	10.331914	9.721166	10.278834	10.053079	9.946921	45	59
2	30	9 668147	10.331853	9.721243	10 278757	10.053096	9.946904	30	58
3	45	9.668207	10.331793	9.721319	10.278681	10.053113	9.946887	15	57
4	46	9.668266	10.331734	9.721396	10.278604	10.053129	9.946871	14	56
5	15	9.668326	10.331674	9.721472	10.278528	10.053146	9.946854	45	55
6	30	9.668386	10.331614	9.721549	10.278451	10.053163	9.946837	30	54
7	45	9.668446	10.331554	9.721626	10.278374	10.053179	9.946821	15	53
8	47	9.668506	10.331494	9.721702	10.278298	10.053196	9.946804	13	52
9	15	9.668566	10.331434	9.721779	10.278221	10.053213	9.946787	45	51
10	30	9.668626	10.331374	9.721855	10.278145	10.053229	9.946771	30	50
11	45	9.668686	10.331314	9.721932	10.278068	10.053246	9.946754	15	49
12	48	9.668746	10.331254	9.722008	10.277992	10 053262	9.946738	12	48
13	15	9.668806	10.331194	9.722085	10.277915	10.053279	9.946721	45	47
14	30	9.668866	10.331134	9.722162	10.277838	10.053296	9.946704	30	46
15	45	9.668926	10.331074	9.722238	10.277762	10.053312	9.946688	15	45
16	49	9.668986	10.331014	9.722315	10.277685	10.053329	9.946671	11	44
17	15	9.669045	10.330955	9.722391	10.277609	10.053346	9.946654	45	43
18	30	9.669105	10.330895	9.722468	10.277532	10.053362	9.946638	30	42
19	45	9.669165	10.330835	9.722544	10.277456	10.053379	9.946621	15	41
20	50	9.669225	10.330775	9.722621	10.277379	10.053396	9.946604	10	40
21	15	9.669285	10.330715	9.722697	10.277303	10.053412	9.946588	45	39
22	30	9.669345	10.330655	9.722774	10.277226	10.053429	9 946571	30	38
23	45	9.669404	10.330596	9.722850	10.277150	10.053446	9.946554	15	37
24	51	9.669464	10.330536	9.722927	10.277073	10.053462	9 946538	9	36
25	15	9.669524	10.330476	9.723003	10.276997	10.053479	9.946521	45	35
26	30	9.669584	10.330416	9.723079	10.276921	10.053496	9.946504	30	34
27	45	9.669643	10.330357	9.723156	10.276844	10.053513	9.946487	15	33
28	52	9.669703	10.330297	9.723232	10.276768	10.053529	9.946471	8	32
29	15	9.669763	10.330237	9.723309	10.276691	10.053546	9 946454	45	31
30	30	9.669823	10.330177	9.723385	10.276615	10.053563	9.946437	30	30
31	45	9.669882	10.330118	9.723462	10.276538	10.053579	9.946421	15	29
32	53	9.669942	10.330058	9.723538	10.276462	10.053596	9.946404	7	28
33	15	9.670002	10.329998	9.723614	10 276386	10.053613	9.946387	45	27
34	30	9.670061	10.329939	9.723691	10.276309	10.053630	9.946370	30	26
35	45	9.670121	10.329879	9.723767	10.276233	10.053646	9.946354	15	25
36	54	9.670181	10 329819	9.723844	10.276156	10.053663	9.946337	6	24
37	15	9.670240	10.329760	9.723920	10.276080	10.053680	9.946320	45	23
38	30	9.670300	10.329700	9.723996	10.276004	10.053696	9.946304	30	22
39	45	9.670360	10.329640	9.724073	10.275927	10.053713	9.946287	15	21
40	55	9.670419	10.329581	9.724149	10.275851	10.053730	9.946270	5	20
41	15	9.670479	10.329521	9.724225	10.275775	10.053747	9.946253	45	19
42	30	9.670538	10.329462	9.724302	10.275698	10.053763	9.946237	30	18
43	45	9.670598	10.329402	9.724378	10.275622	10.053780	9.946220	15	17
44	56	9.670658	10.329342	9.724454	10.275546	10.053797	9.946203	4	16
45	15	9.670717	10.329283	9.724531	10.275469	10.053814	9.946186	45	15
46	30	9.670777	10.329223	9.724607	10.275393	10 053830	9.946170	30	14
47	45	9 670836	10.329164	9.724683	10.275317	10.053847	9.946153	15	13
48	57	9.670896	10.329104	9.724759	10.275241	10.053864	9.946136	3	12
49	15	9.670955	10.329045	9.724836	10.275164	10.053881	9 946119	45	11
50	30	9.671015	10.328985	9.724912	10.275088	10.053897	9.946103	30	10
51	45	9.671074	10.328926	9.724988	10.275012	10.053914	9.946086	15	9
52	58	9.671134	10.328866	9.725065	10.274935	10.053931	9.946069	2	8
53	15	9.671193	10.328807	9.725141	10.274859	10.053948	9.946052	45	7
54	30	9.671253	10.328747	9.725217	10.274783	10.053964	9.946036	30	6
55	45	9.671312	10.328688	9.725293	10.274707	10.053981	9.946019	15	5
56	59	9.671372	10.328628	9.725369	10.274631	10.053998	9.946002	1	4
57	15	9.671431	10.328569	9.725446	10.274554	10.054015	9.945985	45	3
58	30	9.671490	10.328510	9.725522	10.274478	10.054032	9.945968	30	2
59	45	9.671550	10.328450	9.725598	10.274402	10.054048	9.945952	15	1
60	60	9.671609	10.328391	9.725674	10.274326	10.054065	9.945935	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
4h 8m.			LOG. SINES, &c.				62 deg.		

1h 52m.		LOG. SINES, &c.					28 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	0	9.671609	10.328391	9.725674	10.274326	10.054065	9.945935	60	60
1	15	9.671669	10.328331	9.725751	10.274249	10.054082	9.945918	45	59
2	30	9.671728	10.328272	9.725827	10.274173	10.054099	9.945901	30	58
3	45	9.671787	10.328213	9.725903	10.274097	10.054116	9.945884	15	57
4	1	9.671847	10.328153	9.725979	10.274021	10.054132	9.945868	59	56
5	15	9.671906	10.328094	9.726055	10.273945	10.054149	9.945851	45	55
6	30	9.671965	10.328035	9.726131	10.273869	10.054166	9.945834	30	54
7	45	9.672025	10.327975	9.726207	10.273793	10.054183	9.945817	15	53
8	2	9.672084	10.327916	9.726284	10.273716	10.054200	9.945800	58	52
9	15	9.672143	10.327857	9.726360	10.273640	10.054216	9.945784	45	51
10	30	9.672203	10.327797	9.726436	10.273564	10.054233	9.945767	30	50
11	45	9.672262	10.327738	9.726512	10.273488	10.054250	9.945750	15	49
12	3	9.672321	10.327679	9.726588	10.273412	10.054267	9.945733	57	48
13	15	9.672381	10.327619	9.726664	10.273336	10.054284	9.945716	45	47
14	30	9.672440	10.327560	9.726740	10.273260	10.054301	9.945699	30	46
15	45	9.672499	10.327501	9.726816	10.273184	10.054317	9.945683	15	45
16	4	9.672558	10.327442	9.726892	10.273108	10.054334	9.945666	56	44
17	15	9.672618	10.327382	9.726968	10.273032	10.054351	9.945649	45	43
18	30	9.672677	10.327323	9.727045	10.272955	10.054368	9.945632	30	42
19	45	9.672736	10.327264	9.727121	10.272879	10.054385	9.945615	15	41
20	5	9.672795	10.327205	9.727197	10.272803	10.054402	9.945598	55	40
21	15	9.672854	10.327146	9.727273	10.272727	10.054418	9.945582	45	39
22	30	9.672913	10.327087	9.727349	10.272651	10.054435	9.945565	30	38
23	45	9.672973	10.327027	9.727425	10.272575	10.054452	9.945548	15	37
24	6	9.673032	10.326968	9.727501	10.272499	10.054469	9.945531	54	36
25	15	9.673091	10.326909	9.727577	10.272423	10.054486	9.945514	45	35
26	30	9.673150	10.326850	9.727653	10.272347	10.054503	9.945497	30	34
27	45	9.673209	10.326791	9.727729	10.272271	10.054520	9.945480	15	33
28	7	9.673268	10.326732	9.727805	10.272195	10.054536	9.945464	53	32
29	15	9.673327	10.326673	9.727881	10.272119	10.054553	9.945447	45	31
30	30	9.673387	10.326613	9.727957	10.272043	10.054570	9.945430	30	30
31	45	9.673446	10.326554	9.728033	10.271967	10.054587	9.945413	15	29
32	8	9.673505	10.326495	9.728109	10.271891	10.054604	9.945396	52	28
33	15	9.673564	10.326436	9.728185	10.271815	10.054621	9.945379	45	27
34	30	9.673623	10.326377	9.728261	10.271739	10.054638	9.945362	30	26
35	45	9.673682	10.326318	9.728336	10.271664	10.054655	9.945345	15	25
36	9	9.673741	10.326259	9.728412	10.271588	10.054672	9.945328	51	24
37	15	9.673800	10.326200	9.728488	10.271512	10.054688	9 945312	45	23
38	30	9.673859	10.326141	9.728564	10 271436	10.054705	9.945295	30	22
39	45	9.673918	10.326082	9.728640	10.271360	10.054722	9.945278	15	21
40	10	9.673977	10.326023	9.728716	10.271284	10.054739	9.945261	50	20
41	15	9.674036	10.325964	9.728792	10.271208	10.054756	9.945244	45	19
42	30	9.674095	10.325905	9.728868	10.271132	10.054773	9.945227	30	18
43	45	9.674154	10.325846	9.728944	10.271056	10.054790	9.945210	15	17
44	11	9.674213	10.325787	9.729020	10.270980	10.054807	9.945193	49	16
45	15	9.674272	10.325728	9.729095	10.270905	10.054824	9.945176	45	15
46	30	9.674331	10.325669	9.729171	10.270829	10.054841	9.945159	30	14
47	45	9.674390	10.325610	9.729247	10.270753	10.054858	9.945142	15	13
48	12	9.674448	10.325552	9.729323	10.270677	10.054875	9.945125	48	12
49	15	9.674507	10.325493	9.729399	10.270601	10.054892	9.945108	45	11
50	30	9.674566	10.325434	9.729475	10.270525	10.054908	9.945092	30	10
51	45	9.674625	10.325375	9.729550	10.270450	10.054925	9.945075	15	9
52	13	9.674684	10.325316	9.729626	10.270374	10.054942	9.945058	47	8
53	15	9.674743	10.325257	9.729702	10.270298	10.054959	9.945041	45	7
54	30	9.674802	10.325198	9.729778	10.270222	10.054976	9.945024	30	6
55	45	9.674860	10.325140	9.729854	10.270146	10.054993	9.945007	15	5
56	14	9.674919	10.325081	9.729929	10.270071	10.055010	9.944990	46	4
57	15	9.674978	10.325022	9.730005	10.269995	10.055027	9.944973	45	3
58	30	9.675037	10.324963	9.730081	10.269919	10.055044	9.944956	30	2
59	45	9.675096	10.324904	9.730157	10.269843	10.055061	9.944939	15	1
60	15	9.675155	10.324845	9.730232	10.269768	10.055078	9.944922	45	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
4h 7m.		LOG. SINES, &c.					61 deg.		

1h 53m.			LOG. SINES, &c.				28 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	15	9.675155	10.324845	9.730232	10.269768	10.055078	9.944922	45	60
1	15	9.675213	10.324787	9.730308	10.269692	10.055095	9.944905	45	59
2	30	9.675272	10.324728	9.730384	10.269616	10.055112	9.944888	30	58
3	45	9.675331	10.324669	9.730460	10.269540	10.055129	9.944871	15	57
4	16	9.675390	10.324610	9.730535	10.269465	10.055146	9.944854	44	56
5	15	9.675448	10.324552	9.730611	10.269389	10.055163	9.944837	45	55
6	30	9.675507	10.324493	9.730687	10.269313	10.055180	9.944820	30	54
7	45	9.675566	10.324434	9.730763	10.269237	10.055197	9.944803	15	53
8	17	9.675624	10.324376	9 730838	10.269162	10.055214	9.944786	43	52
9	15	9.675683	10.324317	9.730914	10.269086	10.055231	9.944769	45	51
10	30	9.675742	10.324258	9.730990	10.269010	10.055248	9.944752	30	50
11	45	9.675800	10.324200	9.731065	10.268935	10.055265	9 944735	15	49
12	18	9.675859	10.324141	9.731141	10.268859	10.055282	9.944718	42	48
13	15	9.675918	10 324082	9.731217	10.268783	10.055299	9.944701	45	47
14	30	9.675976	10.324024	9.731292	10.268708	10.055316	9.944684	30	46
15	45	9 676035	10 323965	9.731368	10.268632	10.055333	9.944667	15	45
16	19	9.676094	10.323906	9.731444	10.268556	10.055350	9.944650	41	44
17	15	9.676152	10.323848	9.731519	10.268481	10.055367	9.944633	45	43
18	30	9.676211	10 323789	9.731595	10.268405	10.055384	9.944616	30	42
19	45	9.676269	10.323731	9.731670	10.268330	10.055401	9.944599	15	41
20	20	9.676328	10.323672	9.731746	10.268254	10.055418	9.944582	40	40
21	15	9.676387	10.323613	9.731822	10.268178	10.055435	9.944565	45	39
22	30	9.676445	10.323555	9.731897	10.268103	10.055452	9.944548	30	38
23	45	9.676504	10.323496	9.731973	10.268027	10.055469	9.944531	15	37
24	21	9.676562	10.323438	9.732048	10.267952	10.055486	9.944514	39	36
25	15	9.676621	10.323379	9.732124	10.267876	10.055503	9.944497	45	35
26	30	9 676679	10.323321	9.732199	10.267801	10.055520	9.944480	30	34
27	45	9.676738	10.323262	9.732275	10.267725	10.055537	9.944463	15	33
28	22	9.676796	10.323204	9.732351	10.267649	10.055554	9.944446	38	32
29	15	9.676855	10.323145	9.732426	10.267574	10.055571	9.944429	45	31
30	30	9.676913	10.323087	9.732502	10.267498	10.055588	9.944412	30	30
31	45	9.676972	10.323028	9 732577	10.267423	10.055606	9.944394	15	29
32	23	9.677030	10.322970	9.732653	10.267347	10.055623	9.944377	37	28
33	15	9.677089	10.322911	9.732728	10.267272	10.055640	9.944360	45	27
34	30	9.677147	10.322853	9.732804	10.267196	10.055657	9.944343	30	26
35	45	9.677205	10.322795	9.732879	10.267121	10.055674	9.944326	15	25
36	24	9.677264	10.322736	9.732955	10.267045	10.055691	9.944309	36	24
37	15	9.677322	10.322678	9.733030	10.266970	10.055708	9.944292	45	23
38	30	9.677381	10.322619	9.733106	10.266894	10.055725	9.944275	30	22
39	45	9.677439	10.322561	9.733181	10.266819	10.055742	9.944258	15	21
40	25	9.677497	10.322503	9.733257	10.266743	10.055759	9.944241	35	20
41	15	9.677556	10.322444	9.733332	10.266668	10.055776	9.944224	45	19
42	30	9.677614	10.322386	9.733407	10.266593	10.055793	9.944207	30	18
43	45	9.677673	10.322327	9.733483	10.266517	10.055810	9.944190	15	17
44	26	9.677731	10.322269	9.733558	10.266442	10.055828	9.944172	34	16
45	15	9.677789	10.322211	9.733634	10.266366	10.055845	9.944155	45	15
46	30	9.677848	10.322152	9.733709	10.266291	10.055862	9.944138	30	14
47	45	9.677906	10.322094	9.733785	10.266215	10.055879	9.944121	15	13
48	27	9.677964	10.322036	9.733860	10.266140	10.055896	9.944104	33	12
49	15	9.678022	10.321978	9.733935	10.266065	10.055913	9.944087	45	11
50	30	9.678081	10.321919	9.734011	10.265989	10.055930	9.944070	30	10
51	45	9.678139	10.321861	9.734086	10.265914	10.055947	9.944053	15	9
52	28	9.678197	10.321803	9.734162	10.265838	10.055964	9.944036	32	8
53	15	9.678255	10.321745	9.734237	10.265763	10.055982	9.944018	45	7
54	30	9.678314	10.321686	9.734312	10.265688	10.055999	9.944001	30	6
55	45	9.678372	10.321628	9.734388	10.265612	10.056016	9.943984	15	5
56	29	9.678430	10.321570	9.734463	10.265537	10.056033	9.943967	31	4
57	15	9.678488	10.321512	9.734538	10.265462	10.056050	9.943950	45	3
58	30	9.678546	10.321454	9.734614	10.265386	10.056067	9.943933	30	2
59	45	9.678605	10.321395	9.734689	10.265311	10.056084	9.943916	15	1
60	30	9.678663	10.321337	9.734764	10.265236	10.056102	9.943898	30	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
4h 6m.			LOG. SINES, &c.				61 deg.		

1h 54m.		LOG. SINES, &c.					28 deg.		
sec.	′	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	′	sec.
0	30	9.678663	10.321337	9.734764	10.265236	10.056102	9.943898	30	60
1	15	9.678721	10.321279	9.734840	10.265160	10.056119	9.943881	45	59
2	30	9.678779	10.321221	9.734915	10.265085	10.056136	9.943864	30	58
3	45	9.678837	10.321163	9.734990	10.265010	10.056153	9.943847	15	57
4	31	9.678895	10.321105	9.735066	10.264934	10.056170	9 943830	29	56
5	15	9.678954	10.321046	9.735141	10.264859	10.056187	9.943813	45	55
6	30	9.679012	10.320988	9.735216	10.264784	10.056204	9.943796	30	54
7	45	9.679070	10.320930	9.735291	10.264709	10.056222	9.943778	15	53
8	32	9.679128	10.320872	9.735367	10.264633	10.056239	9.943761	28	52
9	15	9.679186	10.320814	9.735442	10.264558	10.056256	9.943744	45	51
10	30	9.679244	10.320756	9.735517	10.264483	10.056273	9.943727	30	50
11	45	9.679302	10.320698	9.735592	10.264408	10.056290	9.943710	15	49
12	33	9.679360	10.320640	9.735668	10.264332	10.056308	9.943692	27	48
13	15	9.679418	10.320582	9.735743	10.264257	10.056325	9.943675	45	47
14	30	9.679476	10.320524	9.735818	10.264182	10.056342	9.943658	30	46
15	45	9.679534	10.320466	9.735893	10.264107	10.056359	9.943641	15	45
16	34	9.679592	10.320408	9.735968	10.264032	10.056376	9.943624	26	44
17	15	9.679650	10.320350	9.736044	10.263956	10.056393	9.943607	45	43
18	30	9.679708	10.320292	9.736119	10.263881	10.056411	9.943589	30	42
19	45	9.679766	10.320234	9.736194	10.263806	10.056428	9.943572	15	41
20	35	9.679824	10.320176	9.736269	10.263731	10.056445	9.943555	25	40
21	15	9.679882	10.320118	9.736344	10.263656	10.056462	9.943538	45	39
22	30	9.679940	10.320060	9.736420	10.263580	10.056480	9.943520	30	38
23	45	9.679998	10.320002	9.736495	10.263505	10.056497	9.943503	15	37
24	36	9.680056	10.319944	9.736570	10.263430	10.056514	9.943486	24	36
25	15	9.680114	10.319886	9.736645	10.263355	10.056531	9.943469	45	35
26	30	9.680172	10.319828	9.736720	10.263280	10.056548	9.943452	30	34
27	45	9.680230	10.319770	9.736795	10.263205	10.056566	9.943434	15	33
28	37	9.680288	10.319712	9.736870	10.263130	10.056583	9.943417	23	32
29	15	9.680345	10.319655	9.736946	10.263054	10.056600	9.943400	45	31
30	30	9.680403	10.319597	9.737021	10.262979	10.056617	9.943383	30	30
31	45	9.680461	10.319539	9.737096	10.262904	10.056635	9.943365	15	29
32	38	9.680519	10.319481	9.737171	10.262829	10.056652	9.943348	22	28
33	15	9.680577	10.319423	9.737246	10.262754	10.056669	9.943331	45	27
34	30	9.680635	10.319365	9.737321	10.262679	10.056686	9.943314	30	26
35	45	9.680693	10.319307	9.737396	10.262604	10.056704	9.943296	15	25
36	39	9.680750	10.319250	9.737471	10.262529	10.056721	9.943279	21	24
37	15	9.680808	10.319192	9.737546	10.262454	10.056738	9.943262	45	23
38	30	9.680866	10.319134	9.737621	10.262379	10.056755	9.943245	30	22
39	45	9.680924	10.319076	9.737696	10.262304	10.056773	9.943227	15	21
40	40	9.680982	10.319018	9.737771	10.262229	10.056790	9.943210	20	20
41	15	9.681039	10.318961	9.737846	10.262154	10.056807	9.943193	45	19
42	30	9.681097	10.318903	9.737921	10.262079	10.056824	9.943176	30	18
43	45	9.681155	10.318845	9.737996	10.262004	10.056842	9.943158	15	17
44	41	9.681213	10.318787	9.738071	10.261929	10.056859	9.943141	19	16
45	15	9.681270	10.318730	9.738146	10.261854	10.056876	9.943124	45	15
46	30	9.681328	10.318672	9.738221	10.261779	10.056894	9.943106	30	14
47	45	9.681386	10.318614	9.738296	10.261704	10.056911	9.943089	15	13
48	42	9.681443	10.318557	9.738371	10.261629	10.056928	9.943072	18	12
49	15	9.681501	10.318499	9.738446	10.261554	10.056945	9.943055	45	11
50	30	9.681559	10.318441	9.738521	10.261479	10.056963	9.943037	30	10
51	45	9.681616	10.318384	9.738596	10.261404	10.056980	9.943020	15	9
52	43	9.681674	10.318326	9.738671	10.261329	10.056997	9.943003	17	8
53	15	9.681732	10.318268	9.738746	10.261254	10.057015	9.942985	45	7
54	30	9.681789	10.318211	9.738821	10.261179	10.057032	9.942968	30	6
55	45	9.681847	10.318153	9.738896	10.261104	10.057049	9.942951	15	5
56	44	9.681905	10.318095	9.738971	10.261029	10.057067	9.942933	16	4
57	15	9.681962	10.318038	9.739046	10.260954	10.057084	9.942916	45	3
58	30	9.682020	10.317980	9.739121	10.260879	10.057101	9.942899	30	2
59	45	9 682077	10.317923	9.739196	10.260804	10.057118	9.942882	15	1
60	45	9.682135	10.317865	9.739271	10.260729	10.057136	9.942864	15	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.

4h 5m.	LOG. SINES, &c.	61 deg.

	1h 55m.		LOG. SINES, &c.				28 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	45	9.682135	10.317865	9.739271	10.260729	10.057136	9.942864	15	60
1	15	9.682192	10.317808	9.739346	10.260654	10.057153	9.942847	45	59
2	30	9.682250	10.317750	9.739420	10.260580	10.057170	9.942830	30	58
3	45	9.682308	10.317692	9.739495	10.260505	10.057188	9.942812	15	57
4	46	9.682365	10.317635	9.739570	10.260430	10.057205	9.942795	14	56
5	15	9.682423	10.317577	9.739645	10.260355	10.057222	9.942778	45	55
6	30	9.682480	10.317520	9.739720	10.260280	10.057240	9.942760	30	54
7	45	9.682538	10.317462	9.739795	10.260205	10.057257	9.942743	15	53
8	47	9.682595	10.317405	9.739870	10.260130	10.057275	9.942725	13	52
9	15	9.682653	10.317347	9.739944	10.260056	10.057292	9.942708	45	51
10	30	9.682710	10.317290	9.740019	10.259981	10.057309	9.942691	30	50
11	45	9.682768	10.317232	9.740094	10.259906	10.057327	9.942673	15	49
12	48	9.682825	10.317175	9.740169	10.259831	10.057344	9.942656	12	48
13	15	9.682882	10.317118	9.740244	10.259756	10.057361	9.942639	45	47
14	30	9.682940	10.317060	9.740318	10.259682	10.057379	9.942621	30	46
15	45	9.682997	10.317003	9.740393	10.259607	10.057396	9.942604	15	45
16	49	9.683055	10.316945	9.740468	10.259532	10.057413	9.942587	11	44
17	15	9.683112	10.316888	9.740543	10.259457	10.057431	9.942569	45	43
18	30	9.683170	10.316830	9.740618	10.259382	10.057448	9.942552	30	42
19	45	9.683227	10.316773	9.740692	10.259308	10.057466	9.942534	15	41
20	50	9.683284	10.316716	9.740767	10.259233	10.057483	9.942517	10	40
21	15	9.683342	10.316658	9 740842	10.259158	10.057500	9.942500	45	39
22	30	9.683399	10.316601	9.740917	10.259083	10.057518	9.942482	30	38
23	45	9.683456	10.316544	9.740991	10.259009	10.057535	9.942465	15	37
24	51	9.683514	10.316486	9.741066	10.258934	10.057552	9.942448	9	36
25	15	9.683571	10.316429	9.741141	10.258859	10.057570	9.942430	45	35
26	30	9.683628	10.316372	9.741216	10.258784	10.057587	9.942413	30	34
27	45	9.683686	10.316314	9.741290	10.258710	10.057605	9 942395	15	33
28	52	9.683743	10.316257	9.741365	10.258635	10.057622	9.942378	8	32
29	15	9.683800	10.316200	9.741440	10.258560	10.057640	9.942360	45	31
30	30	9.683857	10.316143	9.741514	10.258486	10.057657	9.942343	30	30
31	45	9.683915	10.316085	9.741589	10.258411	10.057674	9.942326	15	29
32	53	9.683972	10.316028	9.741664	10.258336	10.057692	9.942308	7	28
33	15	9.684029	10.315971	9.741738	10.258262	10.057709	9.942291	45	27
34	30	9.684086	10.315914	9.741813	10.258187	10.057727	9.942273	30	26
35	45	9.684144	10.315856	9.741888	10.258112	10.057744	9.942256	15	25
36	54	9.684201	10.315799	9.741962	10.258038	10.057761	9.942239	6	24
37	15	9.684258	10.315742	9.742037	10.257963	10.057779	9.942221	45	23
38	30	9.684315	10.315685	9.742112	10.257888	10.057796	9.942204	30	22
39	45	9.684373	10.315627	9.742186	10.257814	10.057814	9.942186	15	21
40	55	9.684430	10.315570	9.742261	10.257739	10.057831	9.942169	5	20
41	15	9.684487	10.315513	9.742336	10.257664	10.057849	9.942151	45	19
42	30	9.684544	10.315456	9.742410	10.257590	10.057866	9.942134	30	18
43	45	9.684601	10.315399	9.742485	10.257515	10.057884	9.942116	15	17
44	56	9.684658	10.315342	9.742559	10.257441	10.057901	9.942099	4	16
45	15	9.684715	10.315285	9.742634	10.257366	10.057919	9.942081	45	15
46	30	9.684773	10.315227	9.742708	10 257292	10.057936	9.942064	30	14
47	45	9.684830	10.315170	9.742783	10.257217	10.057953	9.942047	15	13
48	57	9.684887	10.315113	9.742858	10.257142	10.057971	9.942029	3	12
49	15	9.684944	10.315056	9.742932	10.257068	10.057988	9.942012	45	11
50	30	9.685001	10.314999	9.743007	10.256993	10.058006	9.941994	30	10
51	45	9.685058	10.314942	9.743081	10.256919	10.058023	9.941977	15	9
52	58	9.685115	10.314885	9.743156	10.256844	10.058041	9.941959	2	8
53	15	9.685172	10.314828	9.743230	10.256770	10.058058	9.941942	45	7
54	30	9.685229	10.314771	9.743305	10.256695	10.058076	9.941924	30	6
55	45	9.685286	10.314714	9.743379	10.256621	10.058093	9.941907	15	5
56	59	9.685343	10.314657	9.743454	10.256546	10.058111	9.941889	1	4
57	15	9.685400	10.314600	9.743528	10.256472	10.058128	9.941872	45	3
58	30	9.685457	10.314543	9.743603	10.256397	10.058146	9.941854	30	2
59	45	9.685514	10.314486	9.743677	10.256323	10.058163	9.941837	15	1
60	60	9.685571	10.314429	9.743752	10.256248	10.058181	9.941819	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	4h 4m.		LOG. SINES, &c.				61 deg.		

1h 56m.		LOG. SINES, &c.					29 deg.		
sec.	′ ″	sine.	cosec.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	0	9.685571	10.314429	9.743752	10.256248	10.058181	9.941819	60	60
1	15	9.685628	10.314372	9.743826	10.256174	10.058198	9.941802	45	59
2	30	9.685685	10.314315	9.743901	10.256099	10.058216	9.941784	30	58
3	45	9.685742	10.314258	9.743975	10.256025	10.058233	9.941767	15	57
4	1	9.685799	10.314201	9.744050	10.255950	10.058251	9.941749	59	56
5	15	9.685856	10.314144	9.744124	10.255876	10.058268	9.941732	45	55
6	30	9.685913	10.314087	9.744199	10.255801	10.058286	9.941714	30	54
7	45	9.685970	10.314030	9.744273	10.255727	10.058303	9.941697	15	53
8	2	9.686027	10.313973	9.744348	10.255652	10.058321	9.941679	58	52
9	15	9.686084	10.313916	9.744422	10.255578	10.058338	9.941662	45	51
10	30	9.686140	10.313860	9.744496	10.255504	10.058356	9.941644	30	50
11	45	9.686197	10.313803	9.744571	10.255429	10.058374	9.941626	15	49
12	3	9.686254	10.313746	9.744645	10.255355	10.058391	9.941609	57	48
13	15	9.686311	10.313689	9.744720	10.255280	10.058409	9.941591	45	47
14	30	9.686368	10.313632	9.744794	10.255206	10.058426	9.941574	30	46
15	45	9.686425	10.313575	9.744868	10.255132	10.058444	9.941556	15	45
16	4	9.686482	10.313518	9.744943	10.255057	10.058461	9.941539	56	44
17	15	9.686538	10.313462	9.745017	10.254983	10.058479	9.941521	45	43
18	30	9.686595	10.313405	9.745092	10.254908	10.058496	9.941504	30	42
19	45	9.686652	10.313348	9.745166	10.254834	10.058514	9.941486	15	41
20	5	9.686709	10.313291	9.745240	10.254760	10.058532	9.941468	55	40
21	15	9.686766	10.313234	9.745315	10.254685	10.058549	9.941451	45	39
22	30	9.686822	10.313178	9.745389	10.254611	10.058567	9.941433	30	38
23	45	9.686879	10.313121	9.745463	10.254537	10.058584	9.941416	15	37
24	6	9.686936	10.313064	9.745538	10.254462	10.058602	9.941398	54	36
25	15	9.686993	10.313007	9.745612	10.254388	10.058619	9.941381	45	35
26	30	9.687049	10.312951	9.745686	10.254314	10.058637	9.941363	30	34
27	45	9.687106	10.312894	9.745761	10.254239	10.058655	9.941345	15	33
28	7	9.687163	10.312837	9.745835	10.254165	10 058672	9.941328	53	32
29	15	9.687219	10.312781	9.745909	10.254091	10.058690	9.941310	45	31
30	30	9.687276	10.312724	9.745983	10.254017	10.058707	9.941293	30	30
31	45	9.687333	10.312667	9.746058	10.253942	10.058725	9.941275	15	29
32	8	9.687389	10.312611	9.746132	10.253868	10.058743	9.941257	52	28
33	15	9.687446	10.312554	9.746206	10.253794	10.058760	9.941240	45	27
34	30	9.687503	10.312497	9.746280	10.253720	10.058778	9.941222	30	26
35	45	9.687559	10.312441	9.746355	10.253645	10.058795	9.941205	15	25
36	9	9.687616	10.312384	9.746429	10.253571	10.058813	9.941187	51	24
37	15	9.687673	10.312327	9.746503	10.253497	10.058831	9.941169	45	23
38	30	9.687729	10.312271	9.746577	10.253423	10.058848	9.941152	30	22
39	45	9.687786	10.312214	9.746652	10.253348	10.058866	9.941134	15	21
40	10	9.687842	10.312158	9.746726	10.253274	10.058883	9.941117	50	20
41	15	9.687899	10.312101	9.746800	10.253200	10.058901	9.941099	45	19
42	30	9.687956	10.312044	9.746874	10.253126	10.058919	9.941081	30	18
43	45	9.688012	10.311988	9.746948	10.253052	10.058936	9.941064	15	17
44	11	9.688069	10.311931	9.747023	10.252977	10.058954	9.941046	49	16
45	15	9.688125	10.311875	9.747097	10.252903	10.058972	9.941028	45	15
46	30	9.688182	10.311818	9.747171	10.252829	10 058989	9.941011	30	14
47	45	9.688238	10.311762	9.747245	10.252755	10.059007	9.940993	15	13
48	12	9.688295	10.311705	9.747319	10.252681	10.059025	9.940975	48	12
49	15	9.688351	10.311649	9.747394	10.252606	10.059042	9.940958	45	11
50	30	9.688408	10.311592	9.747468	10.252532	10.059060	9.940940	30	10
51	45	9.688464	10.311536	9.747542	10.252458	10.059078	9.940922	15	9
52	13	9.688521	10.311479	9.747616	10.252384	10.059095	9.940905	47	8
53	15	9.688577	10.311423	9.747690	10.252310	10.059113	9.940887	45	7
54	30	9.688634	10.311366	9.747764	10.252236	10.059131	9.940869	30	6
55	45	9.688690	10.311310	9.747838	10.252162	10.059148	9.940852	15	5
56	14	9.688747	10.311253	9.747912	10.252088	10.059166	9.940834	46	4
57	15	9 688803	10.311197	9.747987	10.252013	10.059184	9.940816	45	3
58	30	9.688859	10.311141	9.748061	10.251939	10.059201	9.940799	30	2
59	45	9.688916	10.311084	9.748135	10.251865	10.059219	9.940781	15	1
60	15	9.688972	10.311028	9.748209	10.251791	10.059237	9.940763	45	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
4h 3m.				LOG. SINES, &c.				60 deg.	

1h 57m.			LOG. SINES, &c.			29 deg.			
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	15	9.688972	10.311028	9.748209	10.251791	10.059237	9.940763	45	60
1	15	9.689029	10.310971	9.748283	10.251717	10.059254	9.940746	45	59
2	30	9.689085	10.310915	9.748357	10.251643	10.059272	9.940728	30	58
3	45	9.689141	10.310859	9.748431	10.251569	10.059290	9.940710	15	57
4	16	9.689198	10.310802	9.748505	10.251495	10.059307	9.940693	44	56
5	15	9.689254	10.310746	9.748579	10.251421	10.059325	9.940675	45	55
6	30	9.689310	10.310690	9.748653	10.251347	10.059343	9.940657	30	54
7	45	9.689367	10.310633	9.748727	10.251273	10.059360	9.940640	15	53
8	17	9.689423	10.310577	9.748801	10.251199	10.059378	9.940622	43	52
9	15	9.689479	10.310521	9.748875	10 251125	10.059396	9.940604	45	51
10	30	9.689536	10 310464	9.748949	10.251051	10.059414	9.940586	30	50
11	45	9.689592	10.310408	9.749023	10.250977	10.059431	9.940569	15	49
12	18	9.689648	10.310352	9.749097	10.250903	10.059449	9.940551	42	48
13	15	9.689705	10.310295	9.749171	10.250829	10.059467	9.940533	45	47
14	30	9.689761	10.310239	9.749245	10.250755	10.059485	9.940515	30	46
15	45	9.689817	10.310183	9.749319	10.250681	10.059502	9.940498	15	45
16	19	9.689873	10.310127	9.749393	10.250607	10.059520	9.940480	41	44
17	15	9.689930	10.310070	9.749467	10.250533	10.059538	9.940462	45	43
18	30	9.689986	10 310014	9.749541	10.250459	10.059555	9.940445	30	42
19	45	9.690042	10 309958	9.749615	10.250385	10.059573	9.940427	15	41
20	20	9.690098	10.309902	9.749689	10 250311	10.059591	9.940409	40	40
21	15	9.690154	10.309846	9.749763	10.250237	10.059609	9.940391	45	39
22	30	9.690211	10.309789	9.749837	10.250163	10.059626	9.940374	30	38
23	45	9.690267	10.309733	9.749911	10.250089	10.059644	9.940356	15	37
24	21	9.690323	10.309677	9.749985	10 250015	10.059662	9.940338	39	36
25	15	9.690379	10.309621	9.750059	10.249941	10.059680	9.940320	45	35
26	30	9.690435	10.309565	9.750133	10.249867	10.059697	9.940303	30	34
27	45	9.690491	10.309509	9.750207	10.249793	10.059715	9.940285	15	33
28	22	9.690548	10.309452	9.750281	10.249719	10.059733	9.940267	38	32
29	15	9.690604	10.309396	9.750354	10.249646	10.059751	9.940249	45	31
30	30	9.690660	10.309340	9.750428	10.249572	10.059769	9.940231	30	30
31	45	9.690716	10.309284	9.750502	10.249498	10.059786	9.940214	15	29
32	23	9.690772	10.309228	9.750576	10 249424	10.059804	9.940196	37	28
33	15	9.690828	10.309172	9.750650	10.249350	10.059822	9.940178	45	27
34	30	9.690884	10.309116	9.750724	10.249276	10.059840	9.940160	30	26
35	45	9.690940	10.309060	9.750798	10.249202	10.059858	9.940142	15	25
36	24	9 690996	10.309004	9.750872	10.249128	10.059875	9.940125	36	24
37	15	9.691052	10.308948	9.750945	10.249055	10.059893	9.940107	45	23
38	30	9.691108	10.308892	9.751019	10.248981	10.059911	9.940089	30	22
39	45	9.691164	10.308836	9.751093	10.248907	10.059929	9.940071	15	21
40	25	9.691220	10.308780	9.751167	10.248833	10.059947	9.940053	35	20
41	15	9.691276	10.308724	9.751241	10.248759	10 059964	9.940036	45	19
42	30	9.691332	10.308668	9.751315	10.248685	10.059982	9.940018	30	18
43	45	9.691388	10.308612	9.751388	10.248612	10.060000	9.940000	15	17
44	26	9.691444	10 308556	9.751462	10 248538	10.060018	9.939982	34	16
45	15	9.691500	10.308500	9.751536	10.248464	10.060036	9.939964	45	15
46	30	9.691556	10.308444	9.751610	10.248390	10.060053	9.939947	30	14
47	45	9.691612	10.308388	9.751683	10.248317	10.060071	9.939929	15	13
48	27	9.691668	10.308332	9.751757	10.248243	10.060089	9.939911	33	12
49	15	9.691724	10 308276	9.751831	10.248169	10.060107	9.939893	45	11
50	30	9.691780	10.308220	9.751905	10.248095	10.060125	9.939875	30	10
51	45	9.691836	10.308164	9.751979	10.248021	10.060143	9.939857	15	9
52	28	9.691892	10.308108	9.752052	10.247948	10.060160	9.939840	32	8
53	15	9.691948	10.308052	9.752126	10.247874	10.060178	9.939822	45	7
54	30	9.692004	10.307996	9.752200	10.247800	10.060196	9.939804	30	6
55	45	9.692060	10.307940	9.752273	10.247727	10.060214	9.939786	15	5
56	29	9.692115	10.307885	9.752347	10 247653	10 060232	9.939768	31	4
57	15	9.692171	10.307829	9.752421	10.247579	10.060250	9.939750	45	3
58	30	9.692227	10.307773	9.752495	10.247505	10.060268	9.939732	30	2
59	45	9.692283	10.307717	9.752568	10.247432	10.060285	9.939715	15	1
60	30	9.692339	10.307661	9.752642	10 247358	10.060303	9.939697	30	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	′	sec.
4h 2m.			LOG. SINES, &c.			60 deg			

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	$1^h\ 58^m$.		LOG. SINES, &c.				29 deg.		
0	30	9.692339	10.307661	9.752642	10.247358	10.060303	9.939697	30	60
1	15	9.692395	10.307605	9.752716	10.247284	10.060321	9.939679	45	59
2	30	9.692450	10.307550	9.752789	10.247211	10.060339	9.939661	30	58
3	45	9.692506	10.307494	9.752863	10.247137	10.060357	9.939643	15	57
4	31	9.692562	10.307438	9.752937	10.247063	10.060375	9.939625	29	56
5	15	9.692618	10.307382	9.753010	10.246990	10.060393	9.939607	45	55
6	30	9.692674	10.307326	9.753084	10.246916	10.060411	9.939589	30	54
7	45	9.692729	10.307271	9.753158	10.246842	10.060428	9.939572	15	53
8	32	9.692785	10.307215	9.753231	10.246769	10.060446	9.939554	28	52
9	15	9.692841	10.307159	9.753305	10.246695	10.060464	9.939536	45	51
10	30	9.692897	10.307103	9.753379	10.246621	10.060482	9.939518	30	50
11	45	9.692952	10.307048	9.753452	10.246548	10.060500	9.939500	15	49
12	33	9.693008	10.306992	9.753526	10.246474	10.060518	9.939482	27	48
13	15	9.693064	10.306936	9.753599	10.246401	10.060536	9.939464	45	47
14	30	9.693119	10.306881	9.753673	10.246327	10.060554	9.939446	30	46
15	45	9.693175	10.306825	9.753747	10.246253	10.060572	9.939428	15	45
16	34	9.693231	10.306769	9.753820	10.246180	10.060590	9.939410	26	44
17	15	9.693286	10.306714	9.753894	10.246106	10.060607	9.939393	45	43
18	30	9.693342	10.306658	9.753967	10.246033	10.060625	9.939375	30	42
19	45	9.693398	10.306602	9.754041	10.245959	10.060643	9.939357	15	41
20	35	9.693453	10.306547	9.754115	10.245885	10.060661	9.939339	25	40
21	15	9.693509	10.306491	9.754188	10.245812	10.060679	9.939321	45	39
22	30	9.693565	10.306435	9.754262	10.245738	10.060697	9.939303	30	38
23	45	9.693620	10.306380	9.754335	10.245665	10.060715	9.939285	15	37
24	36	9.693676	10.306324	9.754409	10.245591	10.060733	9.939267	24	36
25	15	9.693731	10.306269	9.754482	10.245518	10.060751	9.939249	45	35
26	30	9.693787	10.306213	9.754556	10.245444	10.060769	9.939231	30	34
27	45	9.693843	10.306157	9.754629	10.245371	10.060787	9.939213	15	33
28	37	9.693898	10.306102	9.754703	10.245297	10.060805	9.939195	23	32
29	15	9.693954	10.306046	9.754776	10.245224	10.060823	9.939177	45	31
30	30	9.694009	10.305991	9.754850	10.245150	10.060841	9.939159	30	30
31	45	9.694065	10.305935	9.754923	10.245077	10.060859	9.939141	15	29
32	38	9.694120	10.305880	9.754997	10.245003	10.060877	9.939123	22	28
33	15	9.694176	10.305824	9.755070	10.244930	10.060895	9.939105	45	27
34	30	9.694231	10.305769	9.755144	10.244856	10.060913	9.939087	30	26
35	45	9.694287	10.305713	9.755217	10.244783	10.060931	9.939069	15	25
36	39	9.694342	10.305658	9.755291	10.244709	10.060949	9.939051	21	24
37	15	9.694398	10.305602	9.755364	10.244636	10.060966	9.939034	45	23
38	30	9.694453	10.305547	9.755438	10.244562	10.060984	9.939016	30	22
39	45	9.694509	10.305491	9.755511	10.244489	10.061002	9.938998	15	21
40	40	9.694564	10.305436	9.755585	10.244415	10.061020	9.938980	20	20
41	15	9.694620	10.305380	9.755658	10.244342	10.061038	9.938962	45	19
42	30	9.694675	10.305325	9.755731	10.244269	10.061056	9.938944	30	18
43	45	9.694730	10.305270	9.755805	10.244195	10.061074	9.938926	15	17
44	41	9.694786	10.305214	9.755878	10.244122	10.061092	9.938908	19	16
45	15	9.694841	10.305159	9.755952	10.244048	10.061110	9.938890	45	15
46	30	9.694897	10.305103	9.756025	10.243975	10.061128	9.938872	30	14
47	45	9.694952	10.305048	9.756098	10.243902	10.061146	9.938854	15	13
48	42	9.695007	10.304993	9.756172	10.243828	10.061164	9.938836	18	12
49	15	9.695063	10.304937	9.756245	10.243755	10.061182	9.938818	45	11
50	30	9.695118	10.304882	9.756319	10.243681	10.061201	9.938799	30	10
51	45	9.695173	10.304827	9.756392	10.243608	10.061219	9.938781	15	9
52	43	9.695229	10.304771	9.756465	10.243535	10.061237	9.938763	17	8
53	15	9.695284	10.304716	9.756539	10.243461	10.061255	9.938745	45	7
54	30	9.695339	10.304661	9.756612	10.243388	10.061273	9.938727	30	6
55	45	9.695395	10.304605	9.756685	10.243315	10.061291	9.938709	15	5
56	44	9.695450	10.304550	9.756759	10.243241	10.061309	9.938691	16	4
57	15	9.695505	10.304495	9.756832	10.243168	10.061327	9.938673	45	3
58	30	9.695561	10.304439	9.756905	10.243095	10.061345	9.938655	30	2
59	45	9.695616	10.304384	9.756979	10.243021	10.061363	9.938637	15	1
60	45	9.695671	10.304329	9.757052	10.242948	10.061381	9.938619	15	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$4^h\ 1^m$.		LOG. SINES, &c.				60 deg.		

	1h 59m.		LOG. SINES, &c.				29 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	45	9.695671	10.304329	9.757052	10.242948	10.061381	9.938619	15	60
1	15	9.695726	10.304274	9.757125	10.242875	10.061309	9.938601	45	59
2	30	9.695782	10.304218	9.757199	10.242801	10.061417	9.938583	30	58
3	45	9.695837	10.304163	9.757272	10.242728	10.061435	9.938565	15	57
4	46	9 695892	10.304108	9.757345	10 242655	10.061453	9 938547	14	56
5	15	9.695947	10.304053	9.757418	10.242582	10.061471	9.938529	45	55
6	30	9.696003	10.303997	9.757492	10.242508	10.061489	9.938511	30	54
7	45	9.696058	10.303942	9.757565	10.242435	10.061507	9.935493	15	53
8	47	9.696113	10.303887	9.757638	10.242362	10.061525	9.938475	13	52
9	15	9.696168	10 303832	9.757711	10.242289	10.061543	9.938457	45	51
10	30	9.696223	10.303777	9.757785	10.242215	10.061562	9.938438	30	50
11	45	9.696278	10.303722	9.757858	10.242142	10.061580	9.938420	15	49
12	48	9.696334	10.303666	9 757931	10.242069	10.061598	9.938402	12	46
13	15	9.696389	10.303611	9.758004	10.241996	10.061616	9.938384	45	47
14	30	9.696444	10.303556	9.758078	10.241922	10 061634	9.938366	30	46
15	45	9.696499	10.303501	9.758151	10.241849	10.061652	9.938348	15	45
16	49	9.696554	10.303446	9.758224	10.241770	10.061670	9.938330	11	44
17	15	9.696609	10.303391	9.758297	10.241703	10.061688	9.938312	45	43
18	30	9.696664	10.303336	9.758371	10.241629	10.061706	9.938294	30	42
19	45	9.696719	10.303281	9.758444	10.241556	10.061724	9.938276	15	41
20	50	9.696774	10.303226	9.758517	10.241483	10.061742	9.938258	10	40
21	15	9.696830	10.303170	9.758590	10.241410	10.061761	9.938239	45	39
22	30	9.696885	10.303115	9.758663	10.241337	10.061779	9.938221	30	38
23	45	9.696940	10.303060	9.758736	10.241264	10.061797	9.938203	15	37
24	51	9.696995	10.303005	9.758810	10.241190	10.061815	9.938185	9	36
25	15	9.697050	10.302950	9.758883	10.241117	10.061833	9.938167	45	35
26	30	9.697105	10.302895	9.758956	10.241044	10.061851	9.938149	30	34
27	45	9.697160	10.302840	9.759029	10.240971	10.061869	9.938131	15	33
28	52	9.697215	10.302785	9.759102	10.240898	10.061887	9.938113	8	32
29	15	9.697270	10.302730	9.759175	10.240825	10.061906	9.938094	45	31
30	30	9.697325	10.302675	9.759248	10.240752	10.061924	9.938076	30	30
31	45	9.697380	10.302620	9.759322	10.240678	10.061942	9.938058	15	29
32	53	9.697435	10.302565	9.759395	10.240605	10.061960	9.938040	7	28
33	15	9.697490	10.302510	9.759468	10.240532	10.061978	9.938022	45	27
34	30	9.697545	10.302455	9.759541	10.240459	10.061996	9.938004	30	26
35	45	9.697600	10.302400	9.759614	10.240386	10.062015	9.937985	15	25
36	54	9.697654	10.302346	9.759687	10.240313	10.062033	9.937967	6	24
37	15	9.697709	10.302291	9.759760	10.240240	10.062051	9.937949	45	23
38	30	9.697764	10.302236	9.759833	10.240167	10.062069	9.937931	30	22
39	45	9.697819	10.302181	9.759906	10.240094	10.062087	9.937913	15	21
40	55	9.697874	10.302126	9.759979	10.240021	10.062105	9.937895	5	20
41	15	9.697929	10.302071	9.760052	10.239948	10.062124	9.937876	45	19
42	30	9.697984	10.302016	9.760125	10.239875	10.062142	9.937858	30	18
43	45	9.698039	10.301961	9.760199	10.239801	10.062160	9.937640	15	17
44	56	9.698094	10.301906	9.760272	10.239728	10.062178	9.937822	4	16
45	15	9.698148	10.301852	9.760345	10.239655	10.062196	9.937804	45	15
46	30	9.698203	10.301797	9.760418	10.239582	10.062214	9.937786	30	14
47	45	9.698258	10.301742	9.760491	10.239509	10.062233	9.937767	15	13
48	57	9.698313	10.301687	9.760564	10.239436	10.062251	9.937749	3	12
49	15	9.698368	10.301632	9.760637	10.239363	10.062269	9.937731	45	11
50	30	9.698422	10.301578	9.760710	10.239290	10.062287	9.937713	30	10
51	45	9.698477	10.301523	9.760783	10.239217	10.062305	9.937695	15	9
52	58	9.698532	10.301468	9.760856	10.239144	10.062324	9.937676	2	8
53	15	9.698587	10.301413	9.760929	10.239071	10.062342	9.937658	45	7
54	30	9.698642	10.301358	9.761002	10.238998	10.062360	9.937640	30	6
55	45	9.698696	10.301304	9.761075	10.238925	10.062378	9.937622	15	5
56	59	9.698751	10.301249	9.761148	10.238852	10.062397	9.937603	1	4
57	15	9.698806	10.301194	9.761220	10.238780	10.062415	9.937585	45	3
58	30	9 698861	10.301139	9.761293	10.238707	10.062433	9.937567	30	2
59	45	9 698915	10.301085	9.761366	10.238634	10.062451	9.937549	15	1
60	60	9.698970	10.301030	9.761439	10.238561	10.062469	9.937531	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	4h 0m.		LOG. SINES, &c.				60 deg.		

	$2^h\ 0^m$.			LOG. SINES, &c.			30 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	0	9.698970	10.301030	9.761439	10.238561	10.062469	9.937531	60	60
1	15	9.699025	10.300975	9.761512	10.238488	10.062488	9.937512	45	59
2	30	9.699079	10.300921	9.761585	10.238415	10.062506	9.937494	30	58
3	45	9.699134	10.300866	9.761658	10.238342	10.062524	9.937476	15	57
4	1	9.699189	10.300811	9.761731	10.238269	10.062542	9.937458	59	56
5	15	9.699243	10.300757	9.761804	10.238196	10.062561	9.937439	45	55
6	30	9.699298	10.300702	9.761877	10.238123	10.062579	9.937421	30	54
7	45	9.699353	10.300647	9.761950	10.238050	10.062597	9.937403	15	53
8	2	9.699407	10.300593	9.762023	10.237977	10.062615	9.937385	58	52
9	15	9.699462	10.300538	9.762096	10.237904	10.062634	9.937366	45	51
10	30	9.699517	10.300483	9.762168	10.237832	10.062652	9.937348	30	50
11	45	9.699571	10.300429	9.762241	10.237759	10.062670	9.937330	15	49
12	3	9.699626	10.300374	9.762314	10.237686	10.062688	9.937312	57	48
13	15	9.699680	10.300320	9.762387	10.237613	10.062707	9.937293	45	47
14	30	9.699735	10.300265	9.762460	10.237540	10.062725	9.937275	30	46
15	45	9.699789	10.300211	9.762533	10.237467	10.062743	9.937257	15	45
16	4	9.699844	10.300156	9.762606	10.237394	10.062762	9.937238	56	44
17	15	9.699899	10.300101	9.762678	10.237322	10.062780	9.937220	45	43
18	30	9.699953	10.300047	9.762751	10.237249	10.062798	9.937202	30	42
19	45	9.700008	10.299992	9.762824	10.237176	10.062816	9.937184	15	41
20	5	9.700062	10.299938	9.762897	10.237103	10.062835	9.937165	55	40
21	15	9.700117	10.299883	9.762970	10.237030	10.062853	9.937147	45	39
22	30	9.700171	10.299829	9.763042	10.236958	10.062871	9.937129	30	38
23	45	9.700226	10.299774	9.763115	10.236885	10.062890	9.937110	15	37
24	6	9.700280	10.299720	9.763188	10.236812	10.062908	9.937092	54	36
25	15	9.700335	10.299665	9.763261	10 236739	10.062926	9.937074	45	35
26	30	9.700389	10.299611	9.763334	10.236666	10.062945	9.937055	30	34
27	45	9.700444	10.299556	9.763406	10.236594	10.062963	9.937037	15	33
28	7	9.700498	10.299502	9.763479	10.236521	10.062981	9.937019	53	32
29	15	9.700552	10.299448	9.763552	10.236448	10.063000	9.937000	45	31
30	30	9.700607	10.299393	9.763625	10.236375	10.063018	9.936982	30	30
31	45	9.700661	10 299339	9.763697	10.236303	10.063036	9.936964	15	29
32	8	9.700716	10.299284	9.763770	10.236230	10.063054	9.936946	52	28
33	15	9.700770	10.299230	9.763843	10.236157	10.063073	9.936927	45	27
34	30	9.700825	10.299175	9.763916	10.236084	10.063091	9.936909	30	26
35	45	9.700879	10.299121	9.763988	10.236012	10.063109	9.936891	15	25
36	9	9.700933	10.299067	9.764061	10.235939	10.063128	9.936872	51	24
37	15	9.700988	10.299012	9.764134	10.235866	10.063146	9.936854	45	23
38	30	9.701042	10.298958	9.764207	10.235793	10.063165	9.936835	30	22
39	45	9.701096	10.298904	9.764279	10.235721	10.063183	9.936817	15	21
40	10	9.701151	10.298849	9.764352	10.235648	10.063201	9.936799	50	20
41	15	9.701205	10.298795	9.764425	10.235575	10.063220	9.936780	45	19
42	30	9.701259	10.298741	9.764497	10.235503	10.063238	9.936762	30	18
43	45	9.701314	10.298686	9.764570	10.235430	10.063256	9.936744	15	17
44	11	9.701368	10.298632	9.764643	10.235357	10.063275	9.936725	49	16
45	15	9.701422	10.298578	9.764715	10.235285	10.063293	9.936707	45	15
46	30	9.701477	10.298523	9.764788	10.235212	10.063311	9.936689	30	14
47	45	9.701531	10.298469	9.764861	10.235139	10.063330	9.936670	15	13
48	12	9.701585	10.298415	9.764933	10.235067	10.063348	9.936652	48	12
49	15	9.701639	10.298361	9.765006	10.234994	10.063367	9.936633	45	11
50	30	9.701694	10.298306	9.765079	10.234921	10.063385	9.936615	30	10
51	45	9.701748	10.298252	9.765151	10.234849	10.063403	9.936597	15	9
52	13	9.701802	10.298198	9.765224	10.234776	10.063422	9.936578	47	8
53	15	9.701856	10.298144	9.765296	10.234704	10.063440	9.936560	45	7
54	30	9.701911	10.298089	9.765369	10.234631	10.063459	9.936541	30	6
55	45	9.701965	10.298035	9.765442	10.234558	10.063477	9.936523	15	5
56	14	9.702019	10.297981	9.765514	10.234486	10.063495	9.936505	46	4
57	15	9.702073	10.297927	9.765587	10.234413	10.063514	9.936486	45	3
58	30	9.702127	10.297873	9.765659	10.234341	10.063532	9.936468	30	2
59	45	9.702182	10.297818	9.765732	10.234268	10.063551	9.936449	15	1
60	15	9.702236	10.297764	9.765805	10.234195	10.063569	9.936431	45	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$3^h\ 59^m$.			LOG. SINES, &c.			59 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
2h 1m.			LOG. SINES, &c.				30 deg.		
0	15	9.702236	10.297764	9.765805	10.234195	10.063569	9.936431	45	60
1	15	9.702290	10.297710	9.765877	10.234123	10.063587	9.936413	45	59
2	30	9.702344	10.297656	9.765950	10.234050	10.063606	9.936394	30	58
3	45	9.702398	10.297602	9.766022	10.233978	10.063624	9.936376	15	57
4	16	9.702452	10.297548	9.766095	10.233905	10.063643	9.936357	44	56
5	15	9.702506	10.297494	9.766167	10.233833	10.063661	9.936339	45	55
6	30	9.702560	10.297440	9.766240	10.233760	10.063680	9.936320	30	54
7	45	9.702615	10.297385	9.766313	10.233687	10.063698	9.936302	15	53
8	17	9.702669	10.297331	9.766385	10.233615	10.063716	9.936284	43	52
9	15	9.702723	10.297277	9.766458	10.233542	10.063735	9.936265	45	51
10	30	9.702777	10.297223	9.766530	10.233470	10.063753	9.936247	30	50
11	45	9.702831	10.297169	9.766603	10.233397	10.063772	9.936228	15	49
12	18	9.702885	10.297115	9.766675	10.233325	10.063790	9.936210	42	48
13	15	9.702939	10.297061	9.766748	10.233252	10.063809	9.936191	45	47
14	30	9.702993	10.297007	9.766820	10.233180	10.063827	9.936173	30	46
15	45	9.703047	10.296953	9.766893	10.233107	10.063846	9.936154	15	45
16	19	9.703101	10.296899	9.766965	10.233035	10.063864	9.936136	41	44
17	15	9.703155	10.296845	9.767038	10.232962	10.063883	9.936117	45	43
18	30	9.703209	10.296791	9.767110	10.232890	10.063901	9.936099	30	42
19	45	9.703263	10.296737	9.767182	10.232818	10.063920	9.936080	15	41
20	20	9.703317	10.296683	9.767255	10.232745	10.063938	9.936062	40	40
21	15	9.703371	10.296629	9.767327	10.232673	10.063956	9.936044	45	39
22	30	9.703425	10.296575	9.767400	10.232600	10.063975	9.936025	30	38
23	45	9.703479	10.296521	9.767472	10.232528	10.063993	9.936007	15	37
24	21	9.703533	10.296467	9.767545	10.232455	10.064012	9.935988	39	36
25	15	9.703587	10.296413	9.767617	10.232383	10.064030	9.935970	45	35
26	30	9.703641	10.296359	9.767690	10.232310	10.064049	9.935951	30	34
27	45	9.703695	10.296305	9.767762	10.232238	10.064067	9.935933	15	33
28	22	9.703749	10.296251	9.767834	10.232166	10.064086	9.935914	38	32
29	15	9.703802	10.296198	9.767907	10.232093	10.064104	9.935896	45	31
30	30	9.703856	10.296144	9.767979	10.232021	10.064123	9.935877	30	30
31	45	9.703910	10.296090	9.768052	10.231948	10.064141	9.935859	15	29
32	23	9.703964	10.296036	9.768124	10.231876	10.064160	9.935840	37	28
33	15	9.704018	10.295982	9.768196	10.231804	10.064178	9.935822	45	27
34	30	9.704072	10.295928	9.768269	10.231731	10.064197	9.935803	30	26
35	45	9.704126	10.295874	9.768341	10.231659	10.064216	9.935784	15	25
36	24	9.704179	10.295821	9.768413	10.231587	10.064234	9.935766	36	24
37	15	9.704233	10.295767	9.768486	10.231514	10.064253	9.935747	45	23
38	30	9.704287	10.295713	9.768558	10.231442	10.064271	9.935729	30	22
39	45	9.704341	10.295659	9.768631	10.231369	10.064290	9.935710	15	21
40	25	9.704395	10.295605	9.768703	10.231297	10.064308	9.935692	35	20
41	15	9.704448	10.295552	9.768775	10.231225	10.064327	9.935673	45	19
42	30	9.704502	10.295498	9.768848	10.231152	10.064345	9.935655	30	18
43	45	9.704556	10.295444	9.768920	10.231080	10.064364	9.935636	15	17
44	26	9.704610	10.295390	9.768992	10.231008	10.064382	9.935618	34	16
45	15	9.704664	10.295336	9.769064	10.230936	10.064401	9.935599	45	15
46	30	9.704717	10.295283	9.769137	10.230863	10.064420	9.935580	30	14
47	45	9.704771	10.295229	9.769209	10.230791	10.064438	9.935562	15	13
48	27	9.704825	10.295175	9.769281	10.230719	10.064457	9.935543	33	12
49	15	9.704878	10.295122	9.769354	10.230646	10.064475	9.935525	45	11
50	30	9.704932	10.295068	9.769426	10.230574	10.064494	9.935506	30	10
51	45	9.704986	10.295014	9.769498	10.230502	10.064512	9.935488	15	9
52	28	9.705040	10.294960	9.769570	10.230430	10.064531	9.935469	32	8
53	15	9.705093	10.294907	9.769643	10.230357	10.064550	9.935450	45	7
54	30	9.705147	10.294853	9.769715	10.230285	10.064568	9.935432	30	6
55	45	9.705201	10.294799	9.769787	10.230213	10.064587	9.935413	15	5
56	29	9.705254	10.294746	9.769860	10.230140	10.064605	9.935396	31	4
57	15	9.705308	10.294692	9.769932	10.230068	10.064624	9.935376	45	3
58	30	9.705362	10.294638	9.770004	10.229996	10.064642	9.935358	30	2
59	45	9.705415	10.294585	9.770076	10.229924	10.064661	9.935339	15	1
60	30	9.705469	10.294531	9.770148	10.229852	10.064680	9.935320	30	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
3h 58m.			LOG. SINES, &c.				59 deg.		

2h 2m.		LOG. SINES, &c.					30 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	30	9.705469	10.294531	9.770148	10.229852	10.064680	9.935320	30	60
1	15	9.705522	10.294478	9.770221	10.229779	10.064698	9.935302	45	59
2	30	9.705576	10.294424	9.770293	10.229707	10.064717	9.935283	30	58
3	45	9.705630	10.294370	9.770365	10.229635	10.064735	9.935265	15	57
4	31	9.705683	10.294317	9.770437	10.229563	10.064754	9.935246	29	56
5	15	9.705737	10.294263	9.770509	10.229491	10.064773	9.935227	45	55
6	30	9.705790	10.294210	9.770582	10.229418	10.064791	9.935209	30	54
7	45	9.705844	10.294156	9.770654	10.229346	10.064810	9.935190	15	53
8	32	9.705897	10.294103	9.770726	10.229274	10.064829	9.935171	28	52
9	15	9.705951	10.294049	9.770798	10.229202	10.064847	9.935153	45	51
10	30	9.706005	10.293995	9.770870	10.229130	10 064866	9.935134	30	50
11	45	9.706058	10.293942	9.770943	10.229057	10.064884	9.935116	15	49
12	33	9.706112	10.293888	9.771015	10.228985	10.064903	9.935097	27	48
13	15	9.706165	10.293835	9.771087	10.228913	10.064922	9.935078	45	47
14	30	9.706219	10.293781	9.771159	10.228841	10.064940	9.935060	30	46
15	45	9.706272	10.293728	9.771231	10.228769	10.064959	9.935041	15	45
16	34	9.706326	10.293674	9.771303	10.228697	10.064978	9.935022	26	44
17	15	9.706379	10.293621	9.771375	10.228625	10.064996	9.935004	45	43
18	30	9.706432	10.293568	9.771447	10.228553	10.065015	9.934985	30	42
19	45	9.706486	10.293514	9.771520	10.228480	10.065034	9.934966	15	41
20	35	9.706539	10.293461	9.771592	10.228408	10.065052	9.934948	25	40
21	15	9.706593	10.293407	9.771664	10.228336	10.065071	9.934929	45	39
22	30	9.706646	10.293354	9.771736	10.228264	10.065090	9.934910	30	38
23	45	9.706700	10.293300	9.771808	10.228192	10.065108	9.934892	15	37
24	36	9.706753	10.293247	9.771880	10.228120	10.065127	9.934873	24	36
25	15	9.706806	10.293194	9.771952	10.228048	10.065146	9.934854	45	35
26	30	9.706860	10.293140	9.772024	10.227976	10.065164	9.934836	30	34
27	45	9.706913	10.293087	9.772096	10.227904	10.065183	9.934817	15	33
28	37	9.706967	10.293033	9.772168	10.227832	10.065202	9.934798	23	32
29	15	9.707020	10.292980	9.772240	10.227760	10.065220	9.934780	45	31
30	30	9.707073	10.292927	9.772312	10.227688	10.065239	9.934761	30	30
31	45	9.707127	10.292873	9.772384	10.227616	10.065258	9.934742	15	29
32	38	9.707180	10.292820	9.772457	10.227543	10.065277	9.934723	22	28
33	15	9.707233	10.292767	9.772529	10.227471	10.065295	9.934705	45	27
34	30	9.707287	10.292713	9.772601	10.227399	10.065314	9.934686	30	26
35	45	9.707340	10.292660	9.772673	10.227327	10.065333	9.934667	15	25
36	39	9.707393	10.292607	9.772745	10.227255	10.065351	9.934649	21	24
37	15	9.707447	10.292553	9.772817	10.227183	10.065370	9.934630	45	23
38	30	9.707500	10.292500	9.772889	10.227111	10.065389	9.934611	30	22
39	45	9.707553	10.292447	9.772961	10.227039	10.065408	9.934592	15	21
40	40	9.707606	10.292394	9.773033	10.226967	10.065426	9.934574	20	20
41	15	9.707660	10.292340	9.773105	10.226895	10.065445	9.934555	45	19
42	30	9.707713	10.292287	9.773177	10.226823	10.065464	9.934536	30	18
43	45	9.707766	10.292234	9.773249	10.226751	10.065482	9.934518	15	17
44	41	9.707819	10.292181	9.773321	10.226679	10.065501	9.934499	19	16
45	15	9.707873	10.292127	9.773393	10.226607	10.065520	9.934480	45	15
46	30	9.707926	10.292074	9.773464	10.226536	10.065539	9.934461	30	14
47	45	9.707979	10.292021	9.773536	10.226464	10.065557	9.934443	15	13
48	42	9.708032	10.291968	9.773608	10.226392	10.065576	9.934424	18	12
49	15	9.708085	10.291915	9.773680	10.226320	10.065595	9.934405	45	11
50	30	9.708139	10.291861	9.773752	10.226248	10.065614	9.934386	30	10
51	45	9.708192	10.291808	9.773824	10.226176	10.065632	9.934368	15	9
52	43	9.708245	10.291755	9.773896	10.226104	10.065651	9.934349	17	8
53	15	9.708298	10.291702	9.773968	10.226032	10.065670	9.934330	45	7
54	30	9.708351	10.291649	9.774040	10.225960	10.065689	9.934311	30	6
55	45	9.708404	10.291596	9.774112	10.225888	10.065708	9.934292	15	5
56	44	9.708457	10.291543	9.774184	10.225816	10.065726	9.934274	16	4
57	15	9.708511	10.291489	9.774256	10.225744	10.065745	9.934255	45	3
58	30	9.708564	10.291436	9.774328	10.225672	10.065764	9.934236	30	2
59	45	9.708617	10.291383	9.774399	10.225601	10.065783	9.934217	15	1
60	45	9.708670	10.291330	9.774471	10.225529	10.065801	9.934199	15	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	′ ′	sec.
3h 57m.		LOG. SINES, &c.					59 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	$2^h\ 3^m$.		LOG. SINES, &c.				30 deg.		
0	45	9.708670	10.291330	9.774471	10.225529	10.065801	9.934199	15	60
1	15	9.708723	10.291277	9.774543	10.225457	10.065820	9.934180	45	59
2	30	9.708776	10.291224	9.774615	10.225385	10.065839	9.934161	30	58
3	45	9.708829	10.291171	9.774687	10.225313	10.065858	9.934142	15	57
4	46	9.708882	10.291118	9.774759	10.225241	10.065877	9.934123	14	56
5	15	9.708935	10.291065	9.774831	10.225169	10.065895	9.934105	45	55
6	30	9.708988	10.291012	9.774902	10.225098	10.065914	9.934086	30	54
7	45	9.709041	10.290959	9.774974	10.225026	10.065933	9.934067	15	53
8	47	9.709094	10.290906	9.775046	10.224954	10.065952	9.934048	13	52
9	15	9.709147	10.290853	9.775118	10.224882	10.065971	9.934029	45	51
10	30	9.709200	10.290800	9.775190	10.224810	10.065990	9.934010	30	50
11	45	9.709253	10.290747	9.775262	10.224738	10.066008	9.933992	15	49
12	48	9.709306	10.290694	9.775333	10.224667	10.066027	9.933973	12	48
13	15	9.709359	10.290641	9.775405	10.224595	10.066046	9.933954	45	47
14	30	9.709412	10.290588	9.775477	10.224523	10.066065	9.933935	30	46
15	45	9.709465	10.290535	9.775549	10.224451	10.066084	9.933916	15	45
16	49	9.709518	10.290482	9.775621	10.224379	10.066102	9 933898	11	44
17	15	9.709571	10.290429	9.775692	10.224308	10.066121	9 933879	45	43
18	30	9.709624	10.290376	9.775764	10.224236	10.066140	9.933860	30	42
19	45	9.709677	10.290323	9.775836	10.224164	10.066159	9.933841	15	41
20	50	9.709730	10.290270	9.775908	10.224092	10.066178	9.933822	10	40
21	15	9.709783	10.290217	9.775979	10.224021	10.066197	9.933803	45	39
22	30	9.709836	10.290164	9.776051	10.223949	10.066216	9.933784	30	38
23	45	9.709889	10.290111	9.776123	10.223877	10.066234	9.933766	15	37
24	51	9.709941	10.290059	9.776195	10.223805	10.066253	9.933747	9	36
25	15	9.709994	10.290006	9.776266	10.223734	10.066270	9.933730	45	35
26	30	9.710047	10.289953	9.776338	10.223662	10.066291	9.933709	30	34
27	45	9.710100	10.289900	9.776410	10.223590	10.066310	9.933690	15	33
28	52	9.710153	10.289847	9.776482	10.223518	10.066329	9.933671	8	32
29	15	9.710206	10.289794	9.776553	10.223447	10.066348	9.933652	45	31
30	30	9.710259	10.289741	9.776625	10.223375	10.066367	9.933633	30	30
31	45	9.710311	10.289689	9.776697	10.223303	10.066385	9.933615	15	29
32	53	9.710364	10.289636	9.776768	10.223232	10.066404	9.933596	7	28
33	15	9.710417	10.289583	9.776840	10.223160	10.066423	9.933577	45	27
34	30	9.710470	10.289530	9.776912	10.223088	10.066442	9.933558	30	26
35	45	9.710523	10.289477	9 776983	10.223017	10.066461	9.933539	15	25
36	54	9.710575	10.289425	9.777055	10.222945	10.066480	9.933520	6	24
37	15	9.710628	10.289372	9.777127	10.222873	10.066499	9.933501	45	23
38	30	9.710681	10.289319	9.777198	10.222802	10.066518	9.933482	30	22
39	45	9.710734	10.289266	9.777270	10.222730	10.066537	9.933463	15	21
40	55	9.710786	10.289214	9.777342	10.222658	10.066556	9.933444	5	20
41	15	9.710839	10.289161	9.777413	10.222587	10.066574	9.933426	45	19
42	30	9.710892	10.289108	9.777485	10.222515	10.066593	9.933407	30	18
43	45	9.710944	10.289056	9.777557	10.222443	10.066612	9.933388	15	17
44	56	9.710997	10.289003	9.777628	10.222372	10.066631	9.933369	4	16
45	15	9.711050	10.288950	9.777700	10.222300	10.066650	9.933350	45	15
46	30	9.711103	10.288897	9.777772	10.222228	10.066669	9.933331	30	14
47	45	9.711155	10.288845	9.777843	10.222157	10.066688	9.933312	15	13
48	57	9.711208	10.288792	9.777915	10.222085	10.066707	9.933293	3	12
49	15	9.711261	10.288739	9.777986	10.222014	10.066726	9.933274	45	11
50	30	9.711313	10.288687	9.778058	10.221942	10.066745	9.933255	30	10
51	45	9.711366	10.288634	9.778130	10.221870	10.066764	9.933236	15	9
52	58	9.711419	10.288581	9 778201	10.221799	10.066783	9.933217	2	8
53	15	9.711471	10.288529	9.778273	10.221727	10.066802	9.933198	45	7
54	30	9.711524	10.288476	9.778344	10.221656	10.066821	9.933179	30	6
55	45	9.711576	10.288424	9.778416	10.221584	10.066840	9.933160	15	5
56	59	9.711629	10.288371	9.778487	10 221513	10.066859	9 933141	1	4
57	15	9.711682	10.288318	9.778559	10.221441	10.066878	9.933122	45	3
58	30	9.711734	10.288266	9 778631	10.221369	10.066897	9.933103	30	2
59	45	9.711787	10.288213	9.778702	10.221298	10.066915	9.933085	15	1
60	60	9 711839	10.288161	9.778774	10.221226	10.066934	9.933066	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$3^h\ 56^m$.		LOG. SINES, &c.				59 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	$2^h\ 4^m$.		LOG. SINES, &c.				31 deg.		
0	0	9 711839	10.288161	9.778774	10.221226	10.066934	9.933066	60	60
1	15	9.711892	10.288108	9.778845	10.221155	10.066953	9.933047	45	59
2	30	9.711944	10.288056	9.778917	10.221083	10.066972	9.933028	30	58
3	45	9.711997	10.288003	9.778988	10.221012	10.066991	9.933009	15	57
4	1	9.712049	10.287951	9.779060	10.220940	10.067010	9.932990	59	56
5	15	9.712102	10.287898	9.779131	10.220869	10.067029	9.932971	45	55
6	30	9.712155	10.287845	9.779203	10.220797	10.067048	9.932952	30	54
7	45	9.712207	10.287793	9.779274	10.220726	10.067067	9.932933	15	53
8	2	9.712260	10.287740	9.779346	10.220654	10.067086	9.932914	58	52
9	15	9.712312	10.287688	9.779417	10.220583	10.067105	9.932895	45	51
10	30	9.712364	10.287636	9.779489	10.220511	10.067124	9.932876	30	50
11	45	9.712417	10.287583	9.779560	10.220440	10.067143	9.932857	15	49
12	3	9.712469	10.287531	9.779632	10.220368	10.067162	9.932838	57	48
13	15	9.712522	10.287478	9.779703	10.220297	10.067181	9.932819	45	47
14	30	9.712574	10.287426	9.779775	10.220225	10 067200	9.932800	30	46
15	45	9.712627	10.287373	9.779846	10.220154	10.067219	9.932781	15	45
16	4	9.712679	10.287321	9.779918	10.220082	10.067238	9.932762	56	44
17	15	9.712732	10.287268	9.779989	10.220011	10.067258	9.932742	45	43
18	30	9.712784	10.287216	9.780061	10.219939	10.067277	9.932723	30	42
19	45	9.712836	10.287164	9.780132	10.219868	10.067296	9.932704	15	41
20	5	9.712889	10.287111	9.780203	10.219797	10.067315	9.932685	55	40
21	15	9.712941	10.287059	9.780275	10.219725	10.067334	9.932666	45	39
22	30	9.712994	10.287006	9.780346	10.219654	10.067353	9.932647	30	38
23	45	9.713046	10.286954	9.780418	10.219582	10.067372	9.932628	15	37
24	6	9.713098	10.286902	9.780489	10.219511	10.067391	9.932609	54	36
25	15	9.713151	10.286849	9.780560	10.219440	10.067410	9.932590	45	35
26	30	9.713203	10.286797	9.780632	10.219368	10.067429	9.932571	30	34
27	45	9.713255	10.286745	9.780703	10 219297	10.067448	9.932552	15	33
28	7	9.713308	10.286692	9.780775	10 219225	10.067467	9.932533	53	32
29	15	9.713360	10.286640	9.780846	10.219154	10.067486	9.932514	45	31
30	30	9.713412	10.286588	9.780917	10.219083	10.067505	9.932495	30	30
31	45	9.713465	10.286535	9.780989	10.219011	10.067524	9.932476	15	29
32	8	9.713517	10.286483	9.781060	10.218940	10.067543	9.932457	52	28
33	15	9.713569	10.286431	9.781131	10.218869	10.067562	9.932438	45	27
34	30	9.713621	10.286379	9.781203	10.218797	10.067581	9.932419	30	26
35	45	9.713674	10.286326	9.781274	10.218726	10.067601	9.932399	15	25
36	9	9.713726	10.286274	9.781346	10.218654	10.067620	9.932380	51	24
37	15	9.713778	10.286222	9.781417	10.218583	10.067639	9.932361	45	23
38	30	9.713830	10.286170	9.781488	10.218512	10.067658	9.932342	30	22
39	45	9.713883	10.286117	9.781560	10.218440	10.067677	9.932323	15	21
40	10	9.713935	10.286065	9.781631	10.218369	10.067696	9.932304	50	20
41	15	9.713987	10.286013	9.781702	10.218298	10.067715	9.932285	45	19
42	30	9.714039	10.285961	9.781773	10.218227	10.067734	9.932266	30	18
43	45	9.714091	10.285909	9.781845	10.218155	10.067753	9 932247	15	17
44	11	9.714144	10.285856	9.781916	10.218084	10.067772	9.932228	49	16
45	15	9.714196	10.285804	9.781987	10.218013	10.067792	9.932208	45	15
46	30	9.714248	10.285752	9.782059	10.217941	10.067811	9.932189	30	14
47	45	9.714300	10.285700	9.782130	10.217870	10 067830	9.932170	15	13
48	12	9.714352	10.285648	9.782201	10.217799	10.067849	9.932151	48	12
49	15	9.714404	10.285596	9.782273	10.217727	10.067868	9.932132	45	11
50	30	9.714457	10.285543	9.782344	10.217656	10.067887	9.932113	30	10
51	45	9.714509	10 285491	9.782415	10.217585	10.067906	9.932094	15	9
52	13	9.714561	10.285439	9.782486	10.217514	10.067925	9.932075	47	8
53	15	9.714613	10.285387	9.782558	10.217442	10.067945	9.932055	45	7
54	30	9.714665	10.285335	9.782629	10.217371	10.067964	9.932036	30	6
55	45	9.714717	10.285283	9.782700	10.217300	10.067983	9.932017	15	5
56	14	9.714769	10.285231	9.782771	10.217229	10.068002	9.931998	46	4
57	15	9.714821	10.285179	9.782843	10.217157	10.068021	9.931979	45	3
58	30	9.714873	10.285127	9.782914	10.217086	10.068040	9.931960	30	2
59	45	9.714925	10.285075	9.782985	10.217015	10.068060	9 931940	15	1
60	15	9.714978	10.285022	9.783056	10.216944	10.068079	9.931921	45	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$3^h\ 55^m$.		LOG. SINES, &c.				58 deg		

	2h 5m.			LOG. SINES, &c.			31 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	15	9.714978	10.285022	9.783056	10.216944	10.068079	9.931921	45	60
1	15	9.715030	10.284970	9.783127	10.216873	10.068098	9.931902	45	59
2	30	9.715082	10.284918	9.783199	10.216801	10.068117	9.931883	30	58
3	45	9.715134	10.284866	9.783270	10.216730	10.068136	9.931864	15	57
4	16	9.715186	10.284814	9.783341	10.216659	10.068155	9.931845	44	56
5	15	9.715238	10.284762	9.783412	10.216588	10.068175	9.931825	45	55
6	30	9.715290	10.284710	9.783483	10.216517	10.068194	9.931806	30	54
7	45	9.715342	10.284658	9.783555	10.216445	10.068213	9.931787	15	53
8	17	9.715394	10.284606	9.783626	10.216374	10.068232	9.931768	43	52
9	15	9.715446	10.284554	9.783697	10.216303	10.068251	9.931749	45	51
10	30	9 715498	10.284502	9.783768	10.216232	10.068271	9.931729	30	50
11	45	9.715550	10.284450	9.783839	10.216161	10.068290	9.931710	15	49
12	18	9.715601	10.284399	9.783910	10.216090	10.068309	9 931691	42	48
13	15	9.715653	10.284347	9.783981	10.216019	10.068328	9.931672	45	47
14	30	9.715705	10.284295	9.784053	10.215947	10.068347	9.931653	30	46
15	45	9.715757	10.284243	9.784124	10.215876	10.068367	9.931633	15	45
16	19	9.715809	10.284191	9.784195	10.215805	10.068386	9.931614	41	44
17	15	9.715861	10.284139	9.784266	10.215734	10.068405	9.931595	45	43
18	30	9.715913	10.284087	9.784337	10.215663	10.068424	9.931576	30	42
19	45	9.715965	10.284035	9.784408	10.215592	10.068443	9.931557	15	41
20	20	9.716017	10.283983	9.784479	10.215521	10.068463	9.931537	40	40
21	15	9.716069	10.283931	9.784550	10.215450	10.068482	9.931518	45	39
22	30	9.716120	10.283880	9.784622	10.215378	10.068501	9.931499	30	38
23	45	9 716172	10.283828	9.784693	10.215307	10.068520	9.931480	15	37
24	21	9.716224	10.283776	9.784764	10.215236	10.068540	9.931460	39	36
25	15	9.716276	10.283724	9.784835	10.215165	10.068559	9.931441	45	35
26	30	9.716328	10 283672	9.784906	10.215094	10.068578	9.931422	30	34
27	45	9.716380	10.283620	9.784977	10.215023	10.068597	9.931403	15	33
28	22	9 716432	10.283568	9.785048	10.214952	10.068617	9.931383	38	32
29	15	9.716483	10 283517	9.785119	10.214881	10.068636	9.931364	45	31
30	30	9.716535	10.283465	9.785190	10.214810	10.068655	9.931345	30	30
31	45	9.716587	10.283413	9.785261	10.214739	10.068674	9.931326	15	29
32	23	9.716639	10.283361	9.785332	10.214668	10.068694	9.931306	37	28
33	15	9.716690	10.283310	9.785403	10.214597	10.068713	9.931287	45	27
34	30	9.716742	10.283258	9.785474	10.214526	10.068732	9.931268	30	26
35	45	9.716794	10.283206	9.785545	10.214455	10.068751	9.931249	15	25
36	24	9.716846	10.283154	9.785616	10.214384	10.068771	9.931229	36	24
37	15	9.716897	10.283103	9.785687	10.214313	10.068790	9.931210	45	23
38	30	9.716949	10.283051	9.785758	10.214242	10.068809	9 931191	30	22
39	45	9.717001	10.282999	9 785829	10.214171	10.068829	9 931171	15	21
40	25	9.717053	10 282947	9 785900	10.214100	10.068848	9.931152	35	20
41	15	9.717104	10.282896	9 785971	10.214029	10.068867	9.931133	45	19
42	30	9.717156	10.282844	9 786042	10.213958	10.068886	9.931114	30	18
43	45	9.717208	10.282792	9.786113	10.213887	10.068906	9.931094	15	17
44	26	9.717259	10.282741	9 786184	10.213816	10.068925	9.931075	34	16
45	15	9.717311	10.282689	9 786255	10.213745	10.068944	9.931056	45	15
46	30	9.717363	10.282637	9.786326	10.213674	10.068964	9.931036	30	14
47	45	9.717414	10.282586	9.786397	10.213603	10.068983	9.931017	15	13
48	27	9.717466	10.282534	9.786468	10.213532	10.069002	9.930998	33	12
49	15	9.717518	10.282482	9.786539	10.213461	10 069022	9.930978	45	11
50	30	9.717569	10.282431	9.786610	10.213390	10.069041	9 930950	30	10
51	45	9.717621	10.282379	9.786681	10.213319	10.060060	9.930940	15	9
52	28	9.717672	10.282328	9.786752	10.213248	10.069080	9.930920	32	8
53	15	9.717724	10.282276	9.786823	10.213177	10.069099	9.930901	45	7
54	30	9.717776	10.282224	9.786894	10.213106	10.069118	9.930882	30	6
55	45	9.717827	10.282173	9.786965	10.213035	10.060138	9.930862	15	5
56	29	9.717879	10.282121	9.787036	10.212964	10.069157	9.930843	31	4
57	15	9.717930	10.282070	9.787107	10.212893	10.069176	9.930824	45	3
58	30	9.717982	10.282018	9.787177	10.212823	10.069196	9.930804	30	2
59	45	9.718034	10.281966	9.787248	10.212752	10.069215	9.930785	15	1
60	30	9.718085	10.281915	9.787319	10.212681	10.069234	9.930766	30	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	3h 54m.			LOG. SINES &c.			58 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	$2^h\ 6^m$.			LOG. SINES, &c.			31 deg.		
0	30	9.718085	10.281915	9.787319	10.212681	10.069234	9.930766	30	60
1	15	9.718137	10.281863	9.787390	10.212610	10.069254	9.930746	45	59
2	30	9.718188	10.281812	9.787461	10.212539	10.069273	9.930727	30	58
3	45	9.718240	10.281760	9.787532	10.212468	10.069292	9.930708	15	57
4	31	9.718291	10.281709	9.787603	10.212397	10.069312	9.930688	29	56
5	15	9.718343	10.281657	9.787674	10.212326	10.069331	9.930669	45	55
6	30	9.718394	10.281606	9 787745	10.212255	10.069350	9.930650	30	54
7	45	9.718446	10.281554	9.787815	10.212185	10.069370	9.930630	15	53
8	32	9.718497	10.281503	9.787886	10.212114	10.069389	9.960611	28	52
9	15	9.718549	10.281451	9.787957	10.212043	10.069409	9.930591	45	51
10	30	9 718600	10.281400	9.788028	10.211972	10.069428	9.930572	30	50
11	45	9.718651	10.281349	9.788099	10.211901	10.069447	9.930553	15	49
12	33	9.718703	10.281297	9.788170	10.211830	10.069467	9.930533	27	48
13	15	9.718754	10.281246	9.788240	10.211760	10.069486	9.930514	45	47
14	30	9.718806	10.281194	9.788311	10.211689	10.069506	9.930494	30	46
15	45	9.718857	10.281143	9.788382	10.211618	10.069525	9.930475	15	45
16	34	9.718909	10.281091	9.788453	10.211547	10.069544	9.930456	26	44
17	15	9.718960	10.281040	9.788524	10.211476	10.069564	9.930436	45	43
18	30	9.719011	10.280989	9.788594	10.211406	10.069583	9.930417	30	42
19	45	9.719063	10.280937	9.788665	10.211335	10.069603	9.930397	15	41
20	35	9.719114	10.280886	9.788736	10.211264	10.069622	9.930378	25	40
21	15	9.719166	10.280834	9.788807	10.211193	10.069641	9.930359	45	39
22	30	9.719217	10.280783	9.788878	10.211122	10.069661	9.930339	30	38
23	45	9.719268	10.280732	9.788948	10.211052	10.069680	9.930320	15	37
24	36	9.719320	10.280680	9.789019	10.210981	10.069700	9.930300	24	36
25	15	9.719371	10.280629	9.789090	10.210910	10.069719	9.930281	45	35
26	30	9.719422	10.280578	9.789161	10.210839	10.069739	9.930261	30	34
27	45	9.719474	10.280526	9.789231	10.210769	10.069758	9.930242	15	33
28	37	9.719525	10.280475	9.789302	10.210698	10.069777	9.930223	23	32
29	15	9.719576	10.280424	9.789373	10.210627	10.069797	9.930203	45	31
30	30	9.719627	10.280373	9.789444	10.210556	10.069816	9.930184	30	30
31	45	9.719679	10.280321	9.789514	10 210486	10.069836	9.930164	15	29
32	38	9.719730	10.280270	9.789585	10.210415	10.069855	9.930145	22	28
33	15	9.719781	10.280219	9.789656	10.210344	10.069875	9.930125	45	27
34	30	9.719833	10.280167	9.789727	10.210273	10.069894	9.930106	30	26
35	45	9.719884	10.280116	9.789797	10.210203	10.069914	9.930086	15	25
36	39	9.719935	10.280065	9.789868	10.210132	10.069933	9.930067	21	24
37	15	9.719986	10.280014	9.789939	10.210061	10.069953	9.930047	45	23
38	30	9.720037	10.279963	9.790009	10.209991	10.069972	9.930028	30	22
39	45	9.720089	10.279911	9.790080	10.209920	10.069991	9.930009	15	21
40	40	9.720140	10.279860	9.790151	10.209849	10.070011	9.929989	20	20
41	15	9.720191	10.279809	9.790221	10.209779	10.070030	9.929970	45	19
42	30	9.720242	10.279758	9.790292	10.209708	10.070050	9.929950	30	18
43	45	9.720293	10.279707	9.790363	10.209637	10.070069	9.929931	15	17
44	41	9.720345	10.279655	9.790433	10.209567	10.070089	9.929911	19	16
45	15	9.720396	10.279604	9.790504	10.209496	10.070108	9.929892	45	15
46	30	9.720447	10.279553	9.790575	10.209425	10.070128	9.929872	30	14
47	45	9.720498	10.279502	9.790645	10.209355	10.070147	9.929853	15	13
48	42	9.720549	10.279451	9.790716	10.209284	10.070167	9.929833	18	12
49	15	9.720600	10.279400	9.790787	10.209213	10.070186	9.929814	45	11
50	30	9.720651	10.279349	9.790857	10.209143	10.070206	9.929794	30	10
51	45	9.720703	10.279297	9.790928	10.209072	10.070225	9.929775	15	9
52	43	9.720754	10.279246	9.790999	10.209001	10.070245	9.929755	17	8
53	15	9 720805	10.279195	9.791069	10.208931	10.070264	9.929736	45	7
54	30	9.720856	10.279144	9.791140	10.208860	10.070284	9.929716	30	6
55	45	9.720907	10.279093	9.791210	10.208790	10.070304	9.929696	15	5
56	44	9.720958	10.279042	9.791281	10.208719	10.070323	9.929677	16	4
57	15	9.721009	10.278991	9.791352	10.208648	10.070343	9.929657	45	3
58	30	9.721060	10.278940	9.791422	10.208578	10.070362	9.929638	30	2
59	45	9.721111	10.278889	9.791493	10.208507	10.070382	9.929618	15	1
60	45	9.721162	10.278838	9.791563	10.208437	10.070401	9.929599	15	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$3^h\ 53^m$.			LOG. SINES, &c.			58 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	$2^h\ 7^m$.		LOG. SINES, &c.				31 deg.		
0	45	9.721162	10.278838	9.791563	10.208437	10.070401	9.929599	15	60
1	15	9.721213	10.278787	9.791634	10.208366	10.070421	9.929579	45	59
2	30	9.721264	10.278736	9.791705	10.208295	10.070440	9.929560	30	58
3	45	9.721315	10.278685	9.791775	10 208225	10.070460	9.929540	15	57
4	46	9.721366	10.278634	9.791846	10.208154	10.070479	9.929521	14	56
5	15	9.721417	10.278583	9.791916	10.208084	10.070499	9.929501	45	55
6	30	9.721468	10.278532	9.791987	10.208013	10.070519	9.929481	30	54
7	45	9.721519	10.278481	9.792057	10.207943	10.070538	9.929462	15	53
8	47	9.721570	10.278430	9.792128	10.207872	10.070558	9.929442	13	52
9	15	9.721621	10.278379	9.792198	10.207802	10.070577	9.929423	45	51
10	30	9.721672	10.278328	9.792269	10.207731	10.070597	9.929403	30	50
11	45	9 721723	10.278277	9.792340	10.207660	10.070616	9.929384	15	49
12	48	9.721774	10.278226	9.792410	10.207590	10.070636	9.929364	12	48
13	15	9.721825	10.278175	9.792481	10.207519	10.070656	9.929344	45	47
14	30	9.721876	10.278124	9.792551	10.207449	10.070675	9.929325	30	46
15	45	9.721927	10.278073	9.792622	10.207378	10.070695	9.929305	15	45
16	49	9.721978	10.278022	9.792692	10.207308	10.070714	9.929286	11	44
17	15	9.722029	10.277971	9.792763	10.207237	10.070734	9 929266	45	43
18	30	9.722080	10.277920	9.792833	10.207167	10.070754	9.929246	30	42
19	45	9.722130	10.277870	9.792904	10.207096	10.070773	9.929227	15	41
20	50	9.722181	10.277819	9.792974	10.207026	10.070793	9.929207	10	40
21	15	9.722232	10.277768	9.793045	10.206955	10.070812	9.929188	45	39
22	30	9.722283	10.277717	9.793115	10.206885	10.070832	9.929168	30	38
23	45	9.722334	10.277666	9.793185	10.206815	10.070852	9.929148	15	37
24	51	9.722385	10.277615	9.793256	10.206744	10.070871	9 929129	9	36
25	15	9.722436	10.277564	9.793326	10.206674	10.070891	9.929109	45	35
26	30	9.722486	10.277514	9.793397	10.206603	10.070910	9.929090	30	34
27	45	9.722537	10.277463	9.793467	10.206533	10.070930	9.929070	15	33
28	52	9.722588	10.277412	9.793538	10.206462	10.070950	9.929050	8	32
29	15	9.722639	10.277361	9.793608	10.206392	10.070969	9.929031	45	31
30	30	9.722690	10.277310	9.793679	10.206321	10.070989	9.929011	30	30
31	45	9.722740	10.277260	9 793749	10.206251	10.071009	9.928991	15	29
32	53	9.722791	10.277209	9.793819	10.206181	10.071028	9.928972	7	28
33	15	9.722842	10.277158	9.793890	10.206110	10.071048	9.928952	45	27
34	30	9.722893	10.277107	9.793960	10.206040	10.071068	9.928932	30	26
35	45	9.722944	10.277056	9.794031	10.205969	10.071087	9.928913	15	25
36	54	9.722994	10.277006	9.794101	10.205899	10.071107	9.928893	6	24
37	15	9.723045	10.276955	9.794171	10.205829	10 071127	9.928873	45	23
38	30	9.723096	10.276904	9.794242	10.205758	10.071146	9.928854	30	22
39	45	9.723146	10.276854	9.794312	10.205688	10.071166	9.928834	15	21
40	55	9.723197	10.276803	9.794383	10.205617	10.071186	9.928814	5	20
41	15	9.723248	10.276752	9.794453	10.205547	10.071205	9.928795	45	19
42	30	9.723299	10.276701	9.794523	10.205477	10.071225	9.928775	30	18
43	45	9.723349	10.276651	9.794594	10.205406	10.071245	9.928755	15	17
44	56	9.723400	10.276600	9.794664	10.205336	10.071264	9.928736	4	16
45	15	9.723451	10.276549	9.794734	10 205266	10.071284	9.928716	45	15
46	30	9.723501	10.276499	9.794805	10 205195	10.071304	9.928696	30	14
47	45	9.723552	10.276448	9.794875	10 205125	10.071323	9.928677	15	13
48	57	9.723603	10.276397	9.794945	10.205055	10.071343	9.928657	3	12
49	15	9.723653	10.276347	9.795016	10.204984	10.071363	9.928637	45	11
50	30	9.723704	10.276296	9.795086	10.204914	10.071382	9.928618	30	10
51	45	9.723754	10.276246	9.795156	10 204844	10.071402	9.928598	15	9
52	58	9.723805	10.276195	9.795227	10.204773	10.071422	9.928578	2	8
53	15	9.723856	10.276144	9.795297	10.204703	10.071441	9.928559	45	7
54	30	9.723906	10.276094	9.795367	10.204633	10.071461	9.928539	30	6
55	45	9.723957	10.276043	9.795438	10.204562	10 071481	9.928519	15	5
56	59	9.724007	10.275993	9.795508	10.204492	10.071501	9.928499	1	4
57	15	9.724058	10.275942	9.795578	10.204422	10.071520	9.928480	45	3
58	30	9.724109	10.275891	9.795649	10.204351	10.071540	9.928460	30	2
59	45	9.724159	10.275841	9.795719	10.204281	10.071560	9.928440	15	1
60	60	9.724210	10.275790	9.795789	10.204211	10.071580	9.928420	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$3^h\ 52^m$.		LOG. SINES &c.				58 deg.		

2h 8m.			LOG. SINES, &c.				32 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	0	9.724210	10.275790	9.795789	10.204211	10.071580	9.928420	60	60
1	15	9.724260	10.275740	9.795859	10.204141	10.071599	9.928401	45	59
2	30	9.724311	10.275689	9.795930	10.204070	10.071619	9.928381	30	58
3	45	9.724361	10.275639	9.796000	10.204000	10.071639	9.928361	15	57
4	1	9.724412	10.275588	9.796070	10.203930	10.071659	9 928341	59	56
5	15	9.724462	10.275538	9.796141	10.203859	10.071678	9.928322	45	55
6	30	9.724513	10.275487	9.796211	10.203789	10.071698	9.928302	30	54
7	45	9 724563	10.275437	9.796281	10.203719	10.071718	9.928282	15	53
8	2	9.724614	10.275386	9.796351	10.203649	10.071738	9.928262	58	52
9	15	9.724664	10.275336	9.796421	10.203579	10.071757	9.928243	45	51
10	30	9.724715	10.275285	9.796492	10.203508	10.071777	9.928223	30	50
11	45	9.724765	10.275235	9.796562	10.203438	10.071797	9.928203	15	49
12	3	9.724816	10.275184	9.796632	10.203368	10.071817	9.928183	57	48
13	15	9.724866	10.275134	9.796702	10.203298	10.071836	9.928164	45	47
14	30	9.724916	10.275084	9.796773	10.203227	10.071856	9.928144	30	46
15	45	9.724967	10.275033	9.796843	10.203157	10.071876	9.928124	15	45
16	4	9.725017	10.274983	9.796913	10.203087	10.071896	9.928104	56	44
17	15	9.725068	10.274932	9.796983	10.203017	10.071916	9.928084	45	43
18	30	9.725118	10.274882	9.797053	10.202947	10.071935	9.928065	30	42
19	45	9.725169	10.274831	9.797124	10.202876	10.071955	9.928045	15	41
20	5	9.725219	10.274781	9.797194	10.202806	10.071975	9.928025	55	40
21	15	9.725269	10.274731	9.797264	10.202736	10.071995	9.928005	45	39
22	30	9.725320	10.274680	9.797334	10.202666	10.072015	9.927985	30	38
23	45	9.725370	10.274630	9.797404	10.202596	10.072034	9.927966	15	37
24	6	9.725420	10.274580	9.797474	10.202526	10.072054	9.927946	54	36
25	15	9.725471	10.274529	9.797545	10.202455	10.072074	9.927926	45	35
26	30	9.725521	10.274479	9.797615	10.202385	10.072094	9.927906	30	34
27	45	9.725571	10.274429	9.797685	10.202315	10.072114	9.927886	15	33
28	7	9.725622	10.274378	9.797755	10.202245	10.072133	9.927867	53	32
29	15	9.725672	10.274328	9.797825	10.202175	10.072153	9.927847	45	31
30	30	9.725722	10.274278	9.797895	10.202105	10.072173	9.927827	30	30
31	45	9.725773	10.274227	9.797965	10.202035	10.072193	9.927807	15	29
32	8	9.725823	10.274177	9.798036	10.201964	10.072213	9.927787	52	28
33	15	9.725873	10.274127	9.798106	10.201894	10.072233	9.927767	45	27
34	30	9.725923	10.274077	9.798176	10.201824	10.072252	9.927748	30	26
35	45	9.725974	10.274026	9.798246	10.201754	10.072272	9.927728	15	25
36	9	9.726024	10.273976	9.798316	10.201684	10.072292	9.927708	51	24
37	15	9.726074	10.273926	9.798386	10.201614	10.072312	9.927688	45	23
38	30	9.726124	10.273876	9.798456	10.201544	10.072332	9.927668	30	22
39	45	9.726175	10.273825	9.798526	10.201474	10.072352	9.927648	15	21
40	10	9.726225	10.273775	9.798596	10.201404	10.072372	9.927628	50	20
41	15	9.726275	10.273725	9.798666	10.201334	10.072391	9.927609	45	19
42	30	9.726325	10.273675	9.798736	10.201264	10.072411	9.927589	30	18
43	45	9.726375	10.273625	9.798807	10.201193	10.072431	9.927569	15	17
44	11	9.726426	10.273574	9.798877	10.201123	10.072451	9.927549	49	16
45	15	9.726476	10.273524	9.798947	10.201053	10.072471	9.927529	45	15
46	30	9.726526	10.273474	9.799017	10.200983	10.072491	9.927509	30	14
47	45	9.726576	10.273424	9.799087	10.200913	10.072511	9.927489	15	13
48	12	9.726626	10.273374	9.799157	10.200843	10 072531	9.927469	48	12
49	15	9.726676	10.273324	9.799227	10.200773	10.072550	9.927450	45	11
50	30	9.726727	10.273273	9.799297	10.200703	10.072570	9.927430	30	10
51	45	9.726777	10.273223	9.799367	10.200633	10.072590	9.927410	15	9
52	13	9.726827	10.273173	9.799437	10.200563	10.072610	9.927390	47	8
53	15	9.726877	10.273123	9.799507	10.200493	10.072630	9.927370	45	7
54	30	9.726927	10.273073	9.799577	10.200423	10.072650	9.927350	30	6
55	45	9.726977	10.273023	9.799647	10.200353	10.072670	9.927330	15	5
56	14	9.727027	10.272973	9.799717	10.200283	10.072690	9.927310	46	4
57	15	9.727077	10.272923	9.799787	10.200213	10.072710	9.927290	45	3
58	30	9.727127	10.272873	9.799857	10.200143	10.072730	9.927270	30	2
59	45	9.727178	10.272822	9.799927	10.200073	10.072750	9.927250	15	1
60	15	9.727228	10.272772	9 799997	10.200003	10.072769	9.927231	45	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
3h 51m.			LOG. SINES, &c.				57 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	2h 9m.		LOG. SINES, &c.				32 deg.		
0	15	9.727228	10.272772	9.799997	10.200003	10.072769	9.927231	45	60
1	15	9.727278	10.272722	9.800067	10.199933	10.072780	9.927211	45	59
2	30	9.727328	10.272672	9.800137	10.199863	10.072800	9.927191	30	58
3	45	9.727378	10.272622	9.800207	10.199793	10.072829	9.927171	15	57
4	16	9.727428	10.272572	9.800277	10.199723	10.072849	9.927151	44	56
5	15	9.727478	10.272522	9.800347	10.199653	10.072869	9.927131	45	55
6	30	9.727528	10.272472	9.800417	10.199583	10.072889	9.927111	30	54
7	45	9.727578	10.272422	9.800487	10.199513	10.072909	9.927091	15	53
8	17	9.727628	10.272372	9.800557	10.199443	10.072929	9.927071	43	52
9	15	9.727678	10.272322	9.800627	10.199373	10.072949	9.927051	45	51
10	30	9.727728	10.272272	9.800697	10.199303	10.072969	9.927031	30	50
11	45	9.727778	10.272222	9.800766	10.199234	10.072989	9.927011	15	49
12	18	9.727828	10.272172	9.800836	10.199164	10.073009	9.926991	42	48
13	15	9.727878	10.272122	9.800906	10.199094	10.073029	9.926971	45	47
14	30	9.727928	10.272072	9.800976	10.199024	10.073049	9.926951	30	46
15	45	9.727978	10.272022	9.801046	10.198954	10.073069	9.926931	15	45
16	19	9.728027	10.271973	9.801116	10.198884	10.073089	9.926911	41	44
17	15	9.728077	10.271923	9.801186	10.198814	10.073109	9.926891	45	43
18	30	9 728127	10.271873	9.801256	10.198744	10.073129	9.926871	30	42
19	45	9.728177	10.271823	9.801326	10.198674	10.073149	9.926851	15	41
20	20	9.728227	10.271773	9.801396	10.198604	10.073169	9.926831	40	40
21	15	9.728277	10.271723	9.801466	10.198534	10.073189	9.926811	45	39
22	30	9.728327	10.271673	9.801535	10.198465	10.073209	9.926791	30	38
23	45	9.728377	10.271623	9.801605	10.198395	10.073229	9.926771	15	37
24	21	9.728427	10.271573	9.801675	10.198325	10.073249	9.926751	39	36
25	15	9.728476	10.271524	9.801745	10.198255	10.073269	9.926731	45	35
26	30	9.728526	10.271474	9.801815	10.198185	10.073289	9.926711	30	34
27	45	9.728576	10.271424	9.801885	10.198115	10.073309	9.926691	15	33
28	22	9.728626	10.271374	9.801955	10.198045	10.073329	9.926671	38	32
29	15	9.728676	10.271324	9.802024	10.197976	10.073349	9.926651	45	31
30	30	9.726726	10.271274	9.802094	10.197906	10.073369	9.926631	30	30
31	45	9.728775	10.271225	9.802164	10.197836	10.073389	9.926611	15	29
32	23	9.728825	10.271175	9.802234	10.197766	10.073409	9.926591	37	28
33	15	9.728875	10.271125	9.802304	10.197696	10.073429	9.926571	45	27
34	30	9.728925	10.271075	9.802374	10.197626	10.073449	9.926551	30	26
35	45	9.728975	10.271025	9.802443	10.197557	10.073469	9.926531	15	25
36	24	9.729024	10.270976	9.802513	10.197487	10.073489	9 926511	36	24
37	15	9.729074	10.270926	9.802583	10.197417	10.073509	9.926491	45	23
38	30	9.729124	10.270876	9.802653	10.197347	10.073529	9.926471	30	22
39	45	9.729174	10.270826	9.802723	10.197277	10.073549	9.926451	15	21
40	25	9.729223	10.270777	9.802792	10.197208	10.073569	9.926431	35	20
41	15	9.729273	10.270727	9.802862	10.197138	10.073589	9.926411	45	19
42	30	9.729323	10.270677	9.802932	10.197068	10.073609	9.926391	30	18
43	45	9.729373	10.270627	9.803002	10.196998	10.073629	9.926371	15	17
44	26	9.729422	10.270578	9.803072	10.196928	10.073649	9.926351	34	16
45	15	9.729472	10.270528	9.803141	10.196859	10.073669	9.926331	45	15
46	30	9.729522	10.270478	9.803211	10.196789	10.073689	9.926311	30	14
47	45	9.729571	10.270429	9.803281	10.196719	10.073710	9.926290	15	13
48	27	9.729621	10.270379	9.803351	10.196649	10.073730	9.926270	33	12
49	15	9.729671	10.270329	9.803420	10.196580	10.073750	9.926250	45	11
50	30	9.729720	10.270280	9.803490	10.196510	10.073770	9.926230	30	10
51	45	9.729770	10.270230	9.803560	10.196440	10.073790	9.926210	15	9
52	28	9.729820	10.270180	9.803630	10.196370	10.073810	9.926190	32	8
53	15	9.729869	10.270131	9.803699	10.196301	10.073830	9.926170	45	7
54	30	9.729919	10.270081	9.803769	10.196231	10.073850	9.926150	30	6
55	45	9.729968	10.270032	9.803839	10.196161	10.073870	9.926130	15	5
56	29	9.730018	10.269982	9.803908	10.196092	10.073890	9.926110	31	4
57	15	9.730068	10.269932	9.803978	10.196022	10.073911	9.926089	45	3
58	30	9.730117	10.269883	9.804048	10.195952	10.073931	9.926069	30	2
59	45	9.730167	10.269833	9.804118	10.195882	10.073951	9.926049	15	1
60	30	9.730216	10.269784	9.804187	10.195813	10.073971	9.926029	30	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	3h 50m.		LOG. SINES, &c.				57 deg		

2h 10m.			LOG. SINES, &c.				32 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	′	sec.
0	30	9.730216	10.269784	9.804187	10.195813	10.073971	9.926029	30	60
1	15	9.730266	10.269734	9.804257	10.195743	10.073991	9.926009	45	59
2	30	9.730316	10.269684	9.804327	10.195673	10.074011	9.925989	30	58
3	45	9.730365	10.269635	9.804396	10.195604	10.074031	9.925969	15	57
4	31	9.730415	10.269585	9.804466	10.195534	10.074051	9.925949	29	56
5	15	9.730464	10.269536	9.804536	10.195464	10.074072	9.925928	45	55
6	30	9.730514	10.269486	9.804605	10.195395	10.074092	9.925908	30	54
7	45	9.730563	10.269437	9.804675	10.195325	10.074112	9.925888	15	53
8	32	9.730613	10.269387	9.804745	10.195255	10.074132	9.925868	28	52
9	15	9.730662	10.269338	9.804814	10.195186	10.074152	9.925848	45	51
10	30	9.730712	10.269288	9.804884	10.195116	10.074172	9.925828	30	50
11	45	9.730761	10.269239	9.804954	10.195046	10.074192	9.925808	15	49
12	33	9.730811	10.269189	9.805023	10.194977	10.074213	9.925787	27	48
13	15	9.730860	10.269140	9.805093	10.194907	10.074233	9.925767	45	47
14	30	9.730910	10.269090	9.805163	10.194837	10.074253	9.925747	30	46
15	45	9.730959	10.269041	9.805232	10.194768	10.074273	9.925727	15	45
16	34	9.731009	10.268991	9.805302	10.194698	10.074293	9.925707	26	44
17	15	9.731058	10.268942	9.805371	10.194629	10.074313	9.925687	45	43
18	30	9.731108	10.268892	9.805441	10.194559	10.074334	9.925666	30	42
19	45	9.731157	10.268843	9.805511	10.194489	10.074354	9.925646	15	41
20	35	9.731206	10.268794	9.805580	10.194420	10.074374	9.925626	25	40
21	15	9.731256	10.268744	9.805650	10.194350	10.074394	9.925606	45	39
22	30	9.731305	10.268695	9.805719	10.194281	10.074414	9.925586	30	38
23	45	9.731355	10.268645	9.805789	10.194211	10.074434	9.925566	15	37
24	36	9.731404	10.268596	9.805859	10.194141	10.074455	9.925545	24	36
25	15	9.731453	10.268547	9.805928	10.194072	10.074475	9.925525	45	35
26	30	9.731503	10.268497	9.805998	10.194002	10.074495	9.925505	30	34
27	45	9.731552	10.268448	9 806067	10.193933	10.074515	9.925485	15	33
28	37	9.731601	10.268399	9.806137	10.193863	10.074535	9.925465	23	32
29	15	9.731651	10.268349	9.806206	10.193794	10.074556	9.925444	45	31
30	30	9.731700	10.268300	9.806276	10.193724	10.074576	9.925424	30	30
31	45	9.731749	10.268251	9.806346	10.193654	10.074596	9.925404	15	29
32	38	9.731799	10.268201	9.806415	10.193585	10.074616	9.925384	22	28
33	15	9.731848	10.268152	9.806485	10.193515	10.074637	9.925363	45	27
34	30	9.731897	10.268103	9.806554	10.193446	10.074657	9.925343	30	26
35	45	9.731947	10.268053	9.806624	10.193376	10.074677	9.925323	15	25
36	39	9.731996	10.268004	9.806693	10.193307	10.074697	9.925303	21	24
37	15	9.732045	10.267955	9.806763	10.193237	10.074718	9.925282	45	23
38	30	9.732095	10.267905	9.806832	10.193168	10.074738	9.925262	30	22
39	45	9.732144	10.267856	9.806902	10.193098	10.074758	9.925242	15	21
40	40	9.732193	10.267807	9.806971	10.193029	10.074778	9.925222	20	20
41	15	9.732242	10.267758	9.807041	10.192959	10.074799	9.925201	45	19
42	30	9.732292	10.267708	9.807110	10.192890	10.074819	9.925181	30	18
43	45	9.732341	10.267659	9.807180	10.192820	10.074839	9.925161	15	17
44	41	9.732390	10.267610	9.807249	10.192751	10.074859	9.925141	19	16
45	15	9.732439	10.267561	9.807319	10.192681	10.074880	9.925120	45	15
46	30	9.732489	10.267511	9.807388	10.192612	10.074900	9.925100	30	14
47	45	9.732538	10.267462	9.807458	10.192542	10.074920	9.925080	15	13
48	42	9.732587	10.267413	9.807527	10.192473	10.074940	9.925060	18	12
49	15	9.732636	10.267364	9.807597	10.192403	10.074961	9.925039	45	11
50	30	9.732685	10.267315	9.807666	10.192334	10.074981	9.925019	30	10
51	45	9.732734	10.267266	9.807736	10.192264	10.075001	9.924999	15	9
52	43	9.732784	10.267216	9.807805	10.192195	10.075021	9.924979	17	8
53	15	9.732833	10.267167	9.807875	10.192125	10.075042	9.924958	45	7
54	30	9.732882	10.267118	9.807944	10.192056	10.075062	9.924938	30	6
55	45	9.732931	10.267069	9.808013	10.191987	10.075082	9.924918	15	5
56	44	9.732980	10.267020	9.808083	10.191917	10.075103	9.924897	16	4
57	15	9.733029	10.266971	9.808152	10.191848	10.075123	9.924877	45	3
58	30	9.733079	10.266921	9.808222	10.191778	10.075143	9.924857	30	2
59	45	9.733128	10.266872	9.808291	10.191709	10.075164	9.924836	15	1
60	45	9.733177	10.266823	9.808361	10.191639	10.075184	9.924816	15	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″	sec.
3h 49m.			LOG. SINES, &c.				57 deg.		

2ª 11ᵐ.			LOG. SINES, &c.				32 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	45	9.733177	10.266823	9 808361	10.191639	10.075184	9.924816	15	60
1	15	9.733226	10.266774	9.808430	10.191570	10.075204	9.924796	45	59
2	30	9.733275	10.266725	9.808499	10.191501	10.075225	9.924775	30	58
3	45	9.733324	10.266676	9.808569	10.191431	10.075245	9.924755	15	57
4	46	9.733373	10.266627	9.808638	10.191362	10.075265	9.924735	14	56
5	15	9.733422	10.266578	9.808708	10.191292	10.075286	9.924714	45	55
6	30	9.733471	10.266529	9.808777	10.191223	10.075306	9.924694	30	54
7	45	9.733520	10.266480	9.808846	10.191154	10.075326	9.924674	15	53
8	47	9.733569	10.266431	9.808916	10.191084	10.075347	9.924653	13	52
9	15	9.733618	10.266382	9.808985	10.191015	10.075367	9.924633	45	51
10	30	9.733667	10.266333	9.809055	10.190945	10.075387	9.924613	30	50
11	45	9.733716	10.266284	9.809124	10.190876	10.075408	9.924592	15	49
12	48	9.733765	10.266235	9 809193	10.190807	10.075428	9.924572	12	48
13	15	9.733814	10.266186	9.809263	10.190737	10.075448	9.924552	45	47
14	30	9.733863	10.266137	9.809332	10.190668	10.075469	9.924531	30	46
15	45	9.733912	10.266088	9.809401	10.190599	10.075489	9.924511	15	45
16	49	9.733961	10.266039	9.809471	10.190529	10.075509	9.924491	11	44
17	15	9.734010	10.265990	9.809540	10.190460	10.075530	9.924470	45	43
18	30	9.734059	10.265941	9.809609	10.190391	10.075550	9.924450	30	42
19	45	9.734108	10.265892	9.809679	10.190321	10.075570	9.924430	15	41
20	50	9.734157	10.265843	9.809748	10.190252	10.075591	9.924409	10	40
21	15	9.734206	10.265794	9.809817	10.190183	10 075611	9.924389	45	39
22	30	9.734255	10.265745	9.809887	10.190113	10.075632	9.924368	30	38
23	45	9.734304	10.265696	9.809956	10.190044	10.075652	9.924348	15	37
24	51	9.734353	10.265647	9.810025	10.189975	10.075672	9.924328	9	36
25	15	9.734402	10.265598	9.810095	10.189905	10.075693	9.924307	45	35
26	30	9.734451	10.265549	9.810164	10.189836	10.075713	9.924287	30	34
27	45	9.734500	10.265500	9.810233	10.189767	10.075734	9.924266	15	33
28	52	9.734548	10.265452	9.810302	10.189698	10.075754	9.924246	8	32
29	15	9.734597	10.265403	9.810372	10 189628	10.075774	9.924226	45	31
30	30	9.734646	10.265354	9.810441	10.189559	10.075795	9.924205	30	30
31	45	9.734695	10.265305	9.810510	10.189490	10.075815	9.924185	15	29
32	53	9.734744	10.265256	9.810580	10.189420	10.075836	9.924164	7	28
33	15	9.734793	10.265207	9.810649	10.189351	10.075856	9.924144	45	27
34	30	9.734842	10.265158	9.810718	10.189282	10.075876	9.924124	30	26
35	45	9.734890	10.265110	9.810787	10.189213	10.075897	9.924103	15	25
36	54	9.734939	10.265061	9.810857	10.189143	10.075917	9.924083	6	24
37	15	9.734988	10 265012	9.810926	10.189074	10.075938	9.924062	45	23
38	30	9.735037	10.264963	9.810995	10.189005	10.075958	9.924042	30	22
39	45	9.735086	10.264914	9.811064	10.188936	10.075979	9.924021	15	21
40	55	9.735134	10.264866	9.811134	10.188866	10.075999	9.924001	5	20
41	15	9.735183	10.264817	9.811203	10.188797	10.076020	9.923980	45	19
42	30	9.735232	10.264768	9.811272	10.188728	10.076040	9.923960	30	18
43	45	9.735281	10.264719	9.811341	10.188659	10.076060	9.923940	15	17
44	56	9.735330	10.264670	9.811410	10.188590	10.076081	9.923919	4	16
45	15	9.735378	10.264622	9.811480	10.188520	10.076101	9.923899	45	15
46	30	9.735427	10.264573	9.811549	10.188451	10.076122	9.923878	30	14
47	45	9.735476	10.264524	9.811618	10.188382	10.076142	9.923858	15	13
48	57	9.735525	10.264475	9.811687	10.188313	10.076163	9.923837	3	12
49	15	9.735573	10.264427	9.811756	10.188244	10.076183	9.923817	45	11
50	30	9.735622	10.264378	9.811826	10.188174	10.076204	9.923796	30	10
51	45	9.735671	10.264329	9.811895	10.188105	10.076224	9.923776	15	9
52	58	9.735719	10.264281	9.811964	10.188036	10.076245	9.923755	2	8
53	15	9.735768	10.264232	9.812033	10.187967	10.076265	9.923735	45	7
54	30	9.735817	10.264183	9.812102	10.187898	10.076286	9.923714	30	6
55	45	9.735865	10.264135	9.812172	10 187828	10.076306	9.923694	15	5
56	59	9.735914	10.264086	9.812241	10.187759	10.076327	9.923673	1	4
57	15	9.735963	10.264037	9.812310	10.187690	10.076347	9.923653	45	3
58	30	9.736011	10.263989	9.812379	10.187621	10.076368	9.923632	30	2
59	45	9.736060	10.263940	9.812448	10.187552	10.076388	9.923612	15	1
60	60	9.736109	10.263891	9.812517	10.187483	10.076409	9.923591	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
3ʰ 48ᵐ.			LOG. SINES &c.				57 deg.		

	2h 12m.		LOG. SINES, &c.				33 deg.			
sec.	′ ″	sine.	cosecant.	tang. nt.	cotangent.	secant.	cosine.	″ ′	sec.
0	0	9.736109	10.263891	9.812517	10.187483	10.076409	9.923591	60	60
1	15	9.736157	10.263843	9.812586	10.187414	10.076429	9.923571	45	59
2	30	9.736206	10.263794	9.812656	10.187344	10.076450	9.923550	30	58
3	45	9.736255	10.263745	9.812725	10.187275	10.076470	9.923530	15	57
4	1	9.736303	10.263697	9.812794	10.187206	10.076491	9.923509	59	56
5	15	9.736352	10.263648	9.812863	10.187137	10.076511	9.923489	45	55
6	30	9 736400	10.263600	9.812932	10.187068	10.076532	9.923468	30	54
7	45	9.736449	10.263551	9.813001	10.186999	10.076552	9.923448	15	53
8	2	9.736498	10.263502	9.813070	10.186930	10.076573	9.923427	58	52
9	15	9.736546	10.263454	9.813139	10.186861	10.076593	9.923407	45	51
10	30	9.736595	10.263405	9.813209	10.186791	10.076614	9.923386	30	50
11	45	9.736643	10 263357	9.813278	10.186722	10.076634	9.923366	15	49
12	3	9.736692	10.263308	9.813347	10.186653	10.076655	9.923345	57	48
13	15	9.736740	10.263260	9.813416	10.186584	10.076676	9.923324	45	47
14	30	9.736789	10.263211	9.813485	10.186515	10.076696	9.923304	30	46
15	45	9.736837	10.263163	9.813554	10.186446	10.076717	9.923283	15	45
16	4	9.736886	10.263114	9.813623	10.186377	10.076737	9.923263	56	44
17	15	9.736934	10.263066	9.813692	10.186308	10.076758	9.923242	45	43
18	30	9.736983	10.263017	9.813761	10.186239	10.076778	9.923222	30	42
19	45	9.737031	10.262969	9.813830	10.186170	10.076799	9.923201	15	41
20	5	9.737080	10.262920	9.813899	10.186101	10.076820	9.923180	55	40
21	15	9.737128	10.262872	9.813968	10.186032	10.076840	9.923160	45	39
22	30	9.737177	10.262823	9.814037	10.185963	10.076861	9.923139	30	38
23	45	9.737225	10.262775	9.814106	10.185894	10.076881	9.923119	15	37
24	6	9.737274	10.262726	9.814175	10.185825	10.076902	9.923098	54	36
25	15	9.737322	10.262678	9.814245	10.185755	10.076922	9.923078	45	35
26	30	9.737371	10.262629	9.814314	10.185686	10.076943	9.923057	30	34
27	45	9.737419	10.262581	9.814383	10.185617	10.076964	9.923036	15	33
28	7	9.737467	10.262533	9.814452	10.185548	10.076984	9.923016	53	32
29	15	9.737516	10.262484	9.814521	10.185479	10.077005	9.922995	45	31
30	30	9.737564	10.262436	9.814590	10.185410	10.077025	9.922975	30	30
31	45	9.737613	10.262387	9.814659	10.185341	10.077046	9.922954	15	29
32	8	9.737661	10.262339	9.814728	10.185272	10.077067	9.922933	52	28
33	15	9.737709	10.262291	9.814797	10.185203	10.077087	9.922913	45	27
34	30	9.737758	10.262242	9.814866	10.185134	10.077108	9.922892	30	26
35	45	9.737806	10.262194	9.814935	10.185065	10.077129	9.922871	15	25
36	9	9.737855	10.262145	9.815004	10.184996	10.077149	9.922851	51	24
37	15	9.737903	10.262097	9.815073	10.184927	10.077170	9.922830	45	23
38	30	9.737951	10.262049	9.815142	10.184858	10.077190	9.922810	30	22
39	45	9.738000	10.262000	9.815211	10.184789	10.077211	9.922789	15	21
40	10	9.738048	10.261952	9.815279	10.184721	10.077232	9.922768	50	20
41	15	9.738096	10.261904	9.815348	10.184652	10.077252	9.922748	45	19
42	30	9.738145	10.261855	9.815417	10.184583	10.077273	9.922727	30	18
43	45	9.738193	10.261807	9.815486	10.184514	10.077294	9.922706	15	17
44	11	9.738241	10.261759	9.815555	10.184445	10.077314	9.922686	49	16
45	15	9 738289	10.261711	9.815624	10.184376	10.077335	9.922665	45	15
46	30	9.738338	10.261662	9.815693	10.184307	10.077356	9.922644	30	14
47	45	9.738386	10.261614	9.815762	10.184238	10.077376	9.922624	15	13
48	12	9.738434	10.261566	9.815831	10.184169	10.077397	9.922603	48	12
49	15	9.738482	10.261518	9.815900	10.184100	10.077418	9.922582	45	11
50	30	9.738531	10.261469	9.815969	10.184031	10.077438	9.922562	30	10
51	45	9.738579	10.261421	9.816038	10.183962	10.077459	9.922541	15	9
52	13	9.738627	10.261373	9.816107	10.183893	10.077480	9.922520	47	8
53	15	9.738675	10.261325	9.816176	10.183824	10.077500	9.922500	45	7
54	30	9.738724	10.261276	9.816245	10.183755	10.077521	9.922479	30	6
55	45	9.738772	10.261228	9.816313	10.183687	10.077542	9.922458	15	5
56	14	9.738820	10.261180	9.816382	10.183618	10.077562	9.922438	46	4
57	15	9.738868	10.261132	9.816451	10.183549	10.077583	9.922417	45	3
58	30	9.738916	10.261084	9.816520	10.183480	10.077604	9.922396	30	2
59	45	9.738965	10.261035	9.816589	10.183411	10.077624	9.922376	15	1
60	15	9.739013	10.260987	9.816658	10.183342	10.077645	9.922355	45	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	3h 47m.		LOG. SINES, &c.				56 deg.		

2h 13m.			LOG. SINES, &c.				33 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	15	9.739013	10.260987	9.816658	10.183342	10.077645	9.922355	45	60
1	15	9.739061	10.260939	9.816727	10.183273	10.077666	9.922334	45	59
2	30	9.739109	10.260891	9.816796	10.183204	10.077687	9.922313	30	58
3	45	9.739157	10.260843	9.816865	10.183135	10.077707	9.922293	15	57
4	16	9.739205	10.260795	9.816933	10.183067	10.077728	9.922272	44	56
5	15	9.739254	10.260746	9.817002	10.182998	10.077749	9.922251	45	55
6	30	9.739302	10.260698	9.817071	10.182929	10.077769	9.922231	30	54
7	45	9.739350	10.260650	9.817140	10.182860	10.077790	9.922210	15	53
8	17	9.739398	10.260602	9.817209	10.182791	10.077811	9.922189	43	52
9	15	9.739446	10.260554	9.817278	10.182722	10 077832	9.922168	45	51
10	30	9.739494	10.260506	9.817346	10.182654	10.077852	9.922148	30	50
11	45	9.739542	10.260458	9.817415	10.182585	10.077873	9.922127	15	49
12	18	9.739590	10.260410	9.817484	10.182516	10.077894	9.922106	42	48
13	15	9.739638	10.260362	9.817553	10.182447	19.077915	9.922085	45	47
14	30	9.739686	10.260314	9.817622	10.182378	10.077935	9.922065	30	46
15	45	9.739735	10.260265	9.817691	10.182309	10.077956	9.922044	15	45
16	19	9.739783	10.260217	9.817759	10.182241	10.077977	9.922023	41	44
17	15	9.739831	10.260169	9.817828	10.182172	10.077998	9.922002	45	43
18	30	9.739879	10.260121	9.817897	10.182103	10.078018	9.921982	30	42
19	45	9.739927	10.260073	9.817966	10.182034	10.078039	9.921961	15	41
20	20	9.739975	10.260025	9.818035	10.181965	10.078060	9.921940	40	40
21	15	9.740023	10.259977	9.818103	10.181897	10.078081	9.921919	45	39
22	30	9.740071	10.259929	9.818172	10.181828	10.078101	9.921899	30	38
23	45	9.740119	10.259881	9.818241	10.181759	10.078122	9.921878	15	37
24	21	9.740167	10.259833	9.818310	10.181690	10.078143	9.921857	39	36
25	15	9.740215	10.259785	9.818379	10.181621	10.078164	9.921836	45	35
26	30	9.740263	10.259737	9.818447	10.181553	10.078185	9.921815	30	34
27	45	9.740311	10.259689	9.818516	10.181484	10.078205	9.921795	15	33
28	22	9.740359	10.259641	9.818585	10.181415	10.078226	9.921774	38	32
29	15	9.740407	10.259593	9.818654	10.181346	10.078247	9.921753	45	31
30	30	9.740455	10.259545	9.818722	10.181278	10.078268	9.921732	30	30
31	45	9.740502	10.259498	9.818791	10.181209	10.078289	9.921711	15	29
32	23	9.740550	10.259450	9.818860	10.181140	10.078309	9.921691	37	28
33	15	9.740598	10.259402	9.818929	10.181071	10.078330	9.921670	45	27
34	30	9.740646	10.259354	9.818997	10.181003	10.078351	9.921649	30	26
35	45	9.740694	10.259306	9.819066	10.180934	10.078372	9.921628	15	25
36	24	9.740742	10.259258	9.819135	10.180865	10.078393	9.921607	36	24
37	15	9.740790	10.259210	9.819203	10.180797	10.078414	9.921586	45	23
38	30	9.740838	10.259162	9.819272	10.180728	10.078434	9.921566	30	22
39	45	9.740886	10.259114	9.819341	10.180659	10.078455	9.921545	15	21
40	25	9.740934	10.259066	9.819410	10.180590	10.078476	9.921524	35	20
41	15	9.740981	10.259019	9.819478	10.180522	10.078497	9.921503	45	19
42	30	9.741029	10.258971	9.819547	10.180453	10.078518	9.921482	30	18
43	45	9.741077	10.258923	9.819616	10.180384	10.078539	9.921461	15	17
44	26	9.741125	10.258875	9.819684	10.180316	10.078559	9.921441	34	16
45	15	9.741173	10.258827	9.819753	10.180247	10.078580	9.921420	45	15
46	30	9.741221	10.258779	9.819822	10.180178	10.078601	9.921399	30	14
47	45	9.741268	10.258732	9.819890	10.180110	10.078622	9.921378	15	13
48	27	9.741316	10.258684	9.819959	10.180041	10.078643	9.921357	33	12
49	15	9.741364	10.258636	9.820028	10.179972	10.078664	9.921336	45	11
50	30	9.741412	10.258588	9.820096	10.179904	10.078685	9.921315	30	10
51	45	9.741460	10.258540	9.820165	10.179835	10.078705	9.921295	15	9
52	28	9.741507	10.258493	9.820234	10.179766	10.078726	9.921274	32	8
53	15	9.741555	10.258445	9.820302	10.179698	10.078747	9.921253	45	7
54	30	9.741603	10.258397	9.820371	10.179629	10.078768	9.921232	30	6
55	45	9.741651	10.258349	9.820440	10.179560	10.078789	9.921211	15	5
56	29	9.741699	10.258301	9.820508	10.179492	10.078810	9.921190	31	4
57	15	9.741746	10.258254	9.820577	10.179423	10.078831	9.921169	45	3
58	30	9.741794	10.258206	9.820646	10.179354	10.078852	9.921148	30	2
59	45	9.741842	10.258158	9.820714	10.179286	10.078873	9.921127	15	1
60	30	9.741889	10.258111	9.820783	10.179217	10.078893	9.921107	30	0
sec.	″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
3h 46m.			LOG. SINES, &c.				56 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	2h 14m.		LOG. SINES, &c.				33 deg.		
0	30	9.741889	10.258111	9.820783	10.179217	10.078893	9.921107	30	60
1	15	9.741937	10.258063	9.820851	10.179149	10.078914	9.921086	45	59
2	30	9.741985	10.258015	9.820920	10.179080	10.078935	9.921065	30	58
3	45	9.742033	10.257967	9.820989	10.179011	10.078956	9.921044	15	57
4	31	9.742080	10.257920	9.821057	10.178943	10.078977	9.921023	29	56
5	15	9.742128	10.257872	9.821126	10.178874	10.078998	9.921002	45	55
6	30	9.742176	10.257824	9.821195	10.178805	10.079019	9.920981	30	54
7	45	9.742223	10.257777	9.821263	10.178737	10.079040	9.920960	15	53
8	32	9.742271	10.257729	9.821332	10.178668	10.079061	9.920939	28	52
9	15	9.742319	10.257681	9.821400	10.178600	10.079082	9.920918	45	51
10	30	9.742366	10.257634	9.821469	10.178531	10.079103	9.920897	30	50
11	45	9.742414	10.257586	9.821537	10.178463	10.079124	9.920876	15	49
12	33	9.742462	10.257538	9.821606	10.178394	10.079145	9.920855	27	48
13	15	9.742509	10.257491	9.821675	10.178325	10.079165	9.920835	45	47
14	30	9.742557	10.257443	9.821743	10.178257	10.079186	9.920814	30	46
15	45	9.742604	10.257396	9.821812	10.178188	10.079207	9.920793	15	45
16	34	9.742652	10.257348	9.821880	10.178120	10.079228	9.920772	26	44
17	15	9.742700	10.257300	9.821949	10.178051	10.079249	9.920751	45	43
18	30	9.742747	10.257253	9.822017	10.177983	10.079270	9.920730	30	42
19	45	9.742795	10.257205	9.822086	10.177914	10.079291	9.920709	15	41
20	35	9.742842	10.257158	9.822154	10.177846	10.079312	9.920688	25	40
21	15	9.742890	10.257110	9.822223	10.177777	10.079333	9.920667	45	39
22	30	9.742937	10.257063	9.822291	10.177709	10.079354	9.920646	30	38
23	45	9.742985	10.257015	9.822360	10.177640	10.079375	9.920625	15	37
24	36	9.743032	10.256968	9.822429	10.177571	10.079396	9.920604	24	36
25	15	9.743080	10.256920	9.822497	10.177503	10.079417	9.920583	45	35
26	30	9.743128	10.256872	9.822566	10.177434	10.079438	9.920562	30	34
27	45	9.743175	10.256825	9.822634	10.177366	10.079459	9.920541	15	33
28	37	9.743223	10.256777	9.822703	10.177297	10.079480	9.920520	23	32
29	15	9.743270	10.256730	9.822771	10.177229	10.079501	9.920499	45	31
30	30	9.743318	10.256682	9.822840	10.177160	10.079522	9.920478	30	30
31	45	9.743365	10.256635	9.822908	10.177092	10.079543	9.920457	15	29
32	38	9.743413	10.256587	9.822977	10.177023	10.079564	9.920436	22	28
33	15	9.743460	10.256540	9.823045	10.176955	10.079585	9.920415	45	27
34	30	9.743507	10.256493	9.823114	10.176886	10.079606	9.920394	30	26
35	45	9.743555	10.256445	9.823182	10.176818	10.079627	9.920373	15	25
36	39	9.743602	10.256398	9.823250	10.176750	10.079648	9.920352	21	24
37	15	9.743650	10.256350	9.823319	10.176681	10.079669	9.920331	45	23
38	30	9.743697	10.256303	9.823387	10.176613	10.079690	9.920310	30	22
39	45	9.743745	10.256255	9.823456	10.176544	10.079711	9.920289	15	21
40	40	9.743792	10.256208	9.823524	10.176476	10.079732	9.920268	20	20
41	15	9.743840	10.256160	9.823593	10.176407	10.079753	9.920247	45	19
42	30	9.743887	10.256113	9.823661	10.176339	10.079774	9.920226	30	18
43	45	9.743934	10.256066	9.823730	10.176270	10.079795	9.920205	15	17
44	41	9.743982	10.256018	9.823798	10.176202	10.079816	9.920184	19	16
45	15	9.744029	10.255971	9.823867	10.176133	10.079837	9.920163	45	15
46	30	9.744076	10.255924	9.823935	10.176065	10.079859	9.920141	30	14
47	45	9.744124	10.255876	9.824003	10.175997	10.079880	9.920120	15	13
48	42	9.744171	10.255829	9.824072	10.175928	10.079901	9.920099	18	12
49	15	9.744219	10.255781	9.824140	10.175860	10.079922	9.920078	45	11
50	30	9.744266	10.255734	9.824209	10.175791	10.079943	9.920057	30	10
51	45	9.744313	10.255687	9.824277	10.175723	10.079964	9.920036	15	9
52	43	9.744361	10.255639	9.824345	10.175655	10.079985	9.920015	17	8
53	15	9.744408	10.255592	9.824414	10.175586	10.080006	9.919994	45	7
54	30	9.744455	10.255545	9.824482	10.175518	10.080027	9.919973	30	6
55	45	9.744502	10.255498	9.824551	10.175449	10.080048	9.919952	15	5
56	44	9.744550	10.255450	9.824619	10.175381	10.080069	9.919931	16	4
57	15	9.744597	10.255403	9.824687	10.175313	10.080090	9.919910	45	3
58	30	9.744644	10.255356	9.824756	10.175244	10.080111	9.919889	30	2
59	45	9.744692	10.255308	9.824824	10.175176	10.080133	9.919867	15	1
60	45	9.744739	10.255261	9.824893	10.175107	10.080154	9.919846	15	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	3h 45m.		LOG. SINES, &c.				56 deg		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	$2^h\ 15^m$.		LOG. SINES, &c.				33 deg.		
0	45	9 744739	10.255261	9.824893	10.175107	10.080154	9.919846	15	60
1	15	9.744786	10.255214	9.824961	10.175039	10 080175	9.919825	45	59
2	30	9.744833	10.255167	9.825029	10.174971	10.080196	9.919804	30	58
3	45	9.744881	10.255119	9.825098	10.174902	10.080217	9.919783	15	57
4	46	9.744928	10.255072	9.825166	10.174834	10.080238	9 919762	14	56
5	15	9.744975	10.255025	9.825234	10.174766	10.080259	9.919741	45	55
6	30	9.745022	10.254978	9.825303	10.174697	10.080280	9.919720	30	54
7	45	9.745070	10.254930	9.825371	10.174629	10.080301	9.919699	15	53
8	47	9 745117	10.254883	9.825439	10.174561	10.080323	9.919677	13	52
9	15	9.745164	10.254836	9.825508	10.174492	10.080344	9.919656	45	51
10	30	9.745211	10.254789	9.825576	10.174424	10.080365	9.919635	30	50
11	45	9.745258	10.254742	9.825644	10.174356	10.080386	9.919614	15	49
12	48	9.745306	10.254694	9.825713	10.174287	10.080407	9.919593	12	48
13	15	9.745353	10.254647	9.825781	10.174219	10.080428	9.919572	45	47
14	30	9.745400	10.254600	9.825849	10.174151	10.080449	9.919551	30	46
15	45	9.745447	10.254553	9.825918	10.174082	10.080471	9.919529	15	45
16	49	9.745494	10.254506	9.825986	10.174014	10.080492	9.919508	11	44
17	15	9.745541	10.254459	9.826054	10.173946	10.080513	9.919487	45	43
18	30	9.745589	10.254411	9.826123	10.173877	10.080534	9.919466	30	42
19	45	9.745636	10.254364	9.826191	10.173809	10.080555	9.919445	15	41
20	50	9.745683	10.254317	9.826259	10.173741	10.080576	9.919424	10	40
21	15	9.745730	10.254270	9.826327	10.173673	10.080598	9.919402	45	39
22	30	9.745777	10.254223	9.826396	10.173604	10.080619	9.919381	30	38
23	45	9.745824	10.254176	9.826464	10.173536	10.080640	9.919360	15	37
24	51	9.745871	10.254129	9.826532	10.173468	10.080661	9.919339	9	36
25	15	9.745918	10.254082	9.826601	10.173399	10.080682	9.919318	45	35
26	30	9.745965	10.254035	9.826669	10.173331	10.080703	9.919297	30	34
27	45	9.746012	10.253988	9.826737	10.173263	10.080725	9.919275	15	33
28	52	9.746059	10.253941	9.826805	10.173195	10.080746	9.919254	8	32
29	15	9.746107	10.253893	9.826874	10.173126	10.080767	9.919233	45	31
30	30	9.746154	10.253846	9.826942	10.173058	10.080788	9.919212	30	30
31	45	9.746201	10.253799	9.827010	10.172990	10.080809	9.919191	15	29
32	53	9.746248	10.253752	9.827078	10.172922	10.080831	9.919169	7	28
33	15	9.746295	10.253705	9.827147	10.172853	10.080852	9.919148	45	27
34	30	9.746342	10.253658	9.827215	10.172785	10.080873	9.919127	30	26
35	45	9.746389	10.253611	9.827283	10.172717	10.080894	9.919106	15	25
36	54	9.746436	10.253564	9.827351	10.172649	10.080916	9.919084	6	24
37	15	9.746483	10.253517	9.827419	10.172581	10.080937	9.919063	45	23
38	30	9.746530	10.253470	9.827488	10.172512	10.080958	9.919042	30	22
39	45	9.746577	10.253423	9.827556	10.172444	10.080979	9.919021	15	21
40	55	9.746624	10.253376	9.827624	10.172376	10.081000	9.919000	5	20
41	15	9.746671	10.253329	9.827692	10.172308	10.081022	9.918978	45	19
42	30	9.746718	10.253282	9.827760	10.172240	10.081043	9.918957	30	18
43	45	9.746765	10.253235	9.827829	10.172171	10.081064	9.918936	15	17
44	56	9.746811	10.253189	9.827897	10.172103	10.081085	9.918915	4	16
45	15	9.746858	10.253142	9.827965	10.172035	10.081107	9.918893	45	15
46	30	9.746905	10.253095	9.828033	10.171967	10.081128	9.918872	30	14
47	45	9.746952	10.253048	9.828101	10.171899	10.081149	9.918851	15	13
48	57	9.746999	10.253001	9.828170	10.171830	10.081170	9.918830	3	12
49	15	9.747046	10.252954	9.828238	10.171762	10.081192	9.918808	45	11
50	30	9.747093	10.252907	9.828306	10.171694	10.081213	9.918787	30	10
51	45	9.747140	10.252860	9.828374	10.171626	10.081234	9.918766	15	9
52	58	9.747187	10.252813	9.828442	10.171558	10.081256	9.918744	2	8
53	15	9.747234	10.252766	9.828510	10.171490	10.081277	9.918723	45	7
54	30	9.747281	10.252719	9.828579	10.171421	10.081298	9.918702	30	6
55	45	9.747327	10.252673	9.828647	10.171353	10.081319	9.918681	15	5
56	59	9.747374	10.252626	9.828715	10.171285	10.081341	9.918659	1	4
57	15	9.747421	10.252579	9.828783	10.171217	10.081362	9.918638	45	3
58	30	9.747468	10.252532	9.828851	10.171149	10.081383	9.918617	30	2
59	45	9.747515	10.252485	9.828919	10.171081	10.081405	9.918595	15	1
60	60	9.747562	10.252438	9.828987	10.171013	10.081426	9.918574	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$3^h\ 44^m$.		LOG. SINES, &c.				56 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
2h 16m.			LOG. SINES, &c.					34 deg.	
0	0	9.747562	10.252438	9 828987	10.171013	10.081426	9.918574	60	60
1	15	9.747608	10.252392	9.829056	10.170944	10.081447	9.918553	45	59
2	30	9.747655	10.252345	9.829124	10.170876	10.081468	9.918532	30	58
3	45	9.747702	10.252298	9.829192	10.170808	10.081490	9.918510	15	57
4	1	9.747749	10.252251	9.829260	10.170740	10.081511	9.918489	59	56
5	15	9.747796	10.252204	9.829328	10.170672	10.081532	9.918468	45	55
6	30	9.747842	10.252158	9.829396	10.170604	10.081554	9.918446	30	54
7	45	9.747889	10.252111	9.829464	10.170536	10.081575	9.918425	15	53
8	2	9.747936	10.252064	9.829532	10.170468	10.081596	9.918404	58	52
9	15	9.747983	10.252017	9.829600	10.170400	10.081618	9.918382	45	51
10	30	9.748029	10.251971	9.829668	10.170332	10.081639	9.918361	30	50
11	45	9.748076	10.251924	9.829737	10.170263	10.081660	9.918340	15	49
12	3	9.748123	10.251877	9.829805	10.170195	10.081682	9.918318	57	48
13	15	9.748170	10.251830	9.829873	10.170127	10.081703	9.918297	45	47
14	30	9.748216	10.251784	9.829941	10.170059	10.081724	9.918276	30	46
15	45	9.748263	10.251737	9.830009	10.169991	10.081746	9.918254	15	45
16	4	9.748310	10.251690	9.830077	10.169923	10.081767	9.918233	56	44
17	15	9.748357	10.251643	9.830145	10.169855	10.081788	9.918212	45	43
18	30	9.748403	10.251597	9.830213	10.169787	10.081810	9.918190	30	42
19	45	9.748450	10.251550	9.830281	10.169719	10.081831	9.918169	15	41
20	5	9.748497	10.251503	9.830349	10.169651	10.081853	9.918147	55	40
21	15	9.748543	10.251457	9.830417	10.169583	10.081874	9.918126	45	39
22	30	9.748590	10.251410	9.830485	10.169515	10.081895	9.918105	30	38
23	45	9.748637	10.251363	9.830553	10.169447	10.081917	9.918083	15	37
24	6	9.748683	10.251317	9.830621	10.169379	10.081938	9.918062	54	36
25	15	9.748730	10.251270	9.830689	10.169311	10.081959	9.918041	45	35
26	30	9.748777	10.251223	9.830757	10.169243	10.081981	9.918019	30	34
27	45	9.748823	10.251177	9.830825	10.169175	10.082002	9.917998	15	33
28	7	9.748870	10.251130	9.830893	10.169107	10.082024	9.917976	53	32
29	15	9.748916	10.251084	9.830961	10.169039	10.082045	9.917955	45	31
30	30	9.748963	10.251037	9.831029	10.168971	10.082066	9.917934	30	30
31	45	9.749010	10.250990	9.831097	10.168903	10.082088	9.917912	15	29
32	8	9.749056	10.250944	9.831165	10.168835	10.082109	9.917891	52	28
33	15	9.749103	10.250897	9.831233	10.168767	10.082131	9.917869	45	27
34	30	9.749149	10.250851	9.831301	10.168699	10.082152	9.917848	30	26
35	45	9.749196	10.250804	9.831369	10.168631	10.082173	9.917827	15	25
36	9	9.749242	10.250758	9.831437	10.168563	10.082195	9.917805	51	24
37	15	9.749289	10.250711	9.831505	10.168495	10.082216	9.917784	45	23
38	30	9.749336	10.250664	9.831573	10.168427	10.082238	9.917762	30	22
39	45	9.749382	10.250618	9.831641	10.168359	10.082259	9.917741	15	21
40	10	9.749429	10.250571	9.831709	10.168291	10.082281	9.917719	50	20
41	15	9.749475	10.250525	9.831777	10.168223	10.082302	9.917698	45	19
42	30	9.749522	10.250478	9.831845	10.168155	10.082324	9.917676	30	18
43	45	9.749568	10.250432	9.831913	10.168087	10.082345	9.917655	15	17
44	11	9.749615	10.250385	9.831981	10.168019	10.082366	9.917634	49	16
45	15	9.749661	10.250339	9.832049	10.167951	10.082388	9.917612	45	15
46	30	9.749708	10.250292	9.832117	10.167883	10.082409	9.917591	30	14
47	45	9.749754	10.250246	9.832185	10.167815	10.082431	9.917569	15	13
48	12	9.749801	10.250199	9.832253	10.167747	10.082452	9.917548	48	12
49	15	9.749847	10.250153	9.832321	10.167679	10.082474	9.917526	45	11
50	30	9.749894	10.250106	9.832389	10.167611	10.082495	9.917505	30	10
51	45	9.749940	10.250060	9.832457	10.167543	10.082517	9.917483	15	9
52	13	9.749987	10.250013	9.832525	10.167475	10.082538	9.917462	47	8
53	15	9.750033	10.249967	9.832593	10.167407	10.082560	9.917440	45	7
54	30	9.750079	10.249921	9.832660	10.167340	10.082581	9.917419	30	6
55	45	9.750126	10.249874	9.832728	10.167272	10.082603	9.917397	15	5
56	14	9.750172	10.249828	9.832796	10.167204	10.082624	9.917376	46	4
57	15	9.750219	10.249781	9.832864	10.167136	10.082646	9.917354	45	3
58	30	9.750265	10.249735	9.832932	10.167068	10.082667	9.917333	30	2
59	45	9.750311	10.249689	9.833000	10.167000	10.082689	9.917311	15	1
60	15	9.750358	10.249642	9.833068	10.166932	10.082710	9.917290	45	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
3h 43m.			LOG. SINES, &c.					55 deg.	

sec.	2h 17m. ′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	′	sec.
	LOG. SINES, &c.							34 deg.	
0	15	9.750358	10.249642	9.833068	10.166932	10.082710	9.917290	45	60
1	15	9.750404	10.249596	9.833136	10.166864	10.082732	9.917268	45	59
2	30	9.750451	10.249549	9.833204	10.166796	10.082753	9.917247	30	58
3	45	9.750497	10.249503	9.833271	10.166729	10.082775	9.917225	15	57
4	16	9.750543	10.249457	9.833339	10.166661	10.082796	9.917204	44	56
5	15	9.750590	10.249410	9.833407	10.166593	10.082818	9.917182	45	55
6	30	9.750636	10.249364	9.833475	10.166525	10.082839	9.917161	30	54
7	45	9.750682	10.249318	9.833543	10.166457	10.082861	9.917139	15	53
8	17	9.750729	10.249271	9.833611	10.166389	10.082882	9.917118	43	52
9	15	9.750775	10.249225	9.833679	10.166321	10.082904	9.917096	45	51
10	30	9.750821	10.249179	9.833747	10.166253	10.082925	9.917075	30	50
11	45	9.750868	10.249132	9.833814	10.166186	10.082947	9.917053	15	49
12	18	9.750914	10.249086	9.833882	10.166118	10.082968	9.917032	42	48
13	15	9.750960	10.249040	9.833950	10.166050	10.082990	9.917010	45	47
14	30	9.751007	10.248993	9.834018	10.165982	10.083011	9.916989	30	46
15	45	9.751053	10.248947	9.834086	10.165914	10.083033	9.916967	15	45
16	19	9.751099	10.248901	9.834154	10.165846	10.083055	9.916945	41	44
17	15	9.751145	10.248855	9.834221	10.165779	10.083076	9.916924	45	43
18	30	9.751192	10.248808	9.834289	10.165711	10.083098	9.916902	30	42
19	45	9.751238	10.248762	9.834357	10.165643	10.083119	9.916881	15	41
20	20	9.751284	10.248716	9.834425	10.165575	10.083141	9.916859	40	40
21	15	9.751330	10.248670	9 834493	10.165507	10.083162	9.916838	45	39
22	30	9.751377	10.248623	9.834560	10.165440	10.083184	9.916816	30	38
23	45	9.751423	10.248577	9.834628	10.165372	10.083206	9.916794	15	37
24	21	9.751469	10.248531	9.834696	10.165304	10.083227	9.916773	39	36
25	15	9.751515	10.248485	9.834764	10.165236	10.083249	9.916751	45	35
26	30	9.751561	10.248439	9.834832	10.165168	10.083270	9.916730	30	34
27	45	9.751608	10.248392	9.834899	10.165101	10.083292	9.916708	15	33
28	22	9.751654	10.248346	9.834967	10 165033	10.083313	9.916687	38	32
29	15	9.751700	10.248300	9.835035	10 164965	10.083335	9.916665	45	31
30	30	9.751746	10.248254	9.835103	10.164897	10.083357	9.916643	30	30
31	45	9.751792	10.248208	9.835171	10.164829	10.083378	9.916622	15	29
32	23	9.751838	10.248162	9.835238	10.164762	10.083400	9.916600	37	28
33	15	9.751885	10.248115	9.835306	10.164694	10.083421	9.916579	45	27
34	30	9.751931	10.248069	9.835374	10.164626	10.083443	9.916557	30	26
35	45	9.751977	10.248023	9.835442	10.164558	10.083465	9.916535	15	25
36	24	9.752023	10.247977	9.835509	10.164491	10.083486	9.916514	36	24
37	15	9.752069	10.247931	9.835577	10.164423	10.083508	9.916492	45	23
38	30	9.752115	10.247885	9.835645	10.164355	10.083530	9.916470	30	22
39	45	9.752161	10.247839	9.835713	10.164287	10.083551	9.916449	15	21
40	25	9.752207	10.247793	9.835780	10.164220	10.083573	9.916427	35	20
41	15	9.752254	10.247746	9.835848	10.164152	10.083595	9.916405	45	19
42	30	9.752300	10.247700	9.835916	10.164084	10.083616	9.916384	30	18
43	45	9.752346	10.247654	9.835984	10.164016	10.083638	9.916362	15	17
44	26	9.752392	10.247608	9.836051	10.163949	10.083659	9.916341	34	16
45	15	9.752438	10.247562	9.836119	10.163881	10.083681	9.916319	45	15
46	30	9.752484	10.247516	9.836187	10.163813	10.083703	9.916297	30	14
47	45	9.752530	10.247470	9.836254	10.163746	10.083724	9.916276	15	13
48	27	9.752576	10.247424	9.836322	10.163678	10.083746	9.916254	33	12
49	15	9.752622	10.247378	9.836390	10.163610	10.083768	9.916232	45	11
50	30	9.752668	10.247332	9.836457	10.163543	10.083789	9.916211	30	10
51	45	9.752714	10.247286	9.836525	10.163475	10.083811	9.916189	15	9
52	28	9.752760	10.247240	9.836593	10.163407	10.083833	9.916167	32	8
53	15	9.752806	10.247194	9.836661	10.163339	10.083854	9.916146	45	7
54	30	9.752852	10.247148	9.836728	10.163272	10.083876	9.916124	30	6
55	45	9.752898	10.247102	9.836796	10.163204	10.083898	9.916102	15	5
56	29	9.752944	10.247056	9.836864	10.163136	10.083920	9.916080	31	4
57	15	9.752990	10.247010	9.836931	10.163069	10.083941	9.916059	45	3
58	30	9 753036	10.246964	9.836999	10.163001	10.083963	9.916037	30	2
59	45	9.753082	10.246918	9.837067	10.162933	10.083985	9.916015	15	1
60	30	9.753128	10.246872	9.837134	10.162866	10.084006	9.915994	30	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	3h 42m.			LOG. SINES, &c.				55 deg.	

sec.	′ ″	sine.	cosecant.	tangent	cotangent.	secant.	cosine.	″ ′	sec.
	$2^h\ 18^m$.		LOG. SINES, &c.				34 deg.		
0	30	9.753128	10.246872	9.837134	10.162866	10.084006	9.915994	30	60
1	15	9.753174	10.246826	9.837202	10.162798	10.084028	9.915972	45	59
2	30	9.753220	10.246780	9.837270	10.162730	10.084050	9.915950	30	58
3	45	9.753266	10.246734	9.837337	10.162663	10.084071	9.915929	15	57
4	31	9.753312	10.246688	9.837405	10.162595	10.084093	9.915907	29	56
5	15	9.753358	10.246642	9.837473	10.162527	10.084115	9.915885	45	55
6	30	9.753404	10.246596	9.837540	10.162460	10.084137	9.915863	30	54
7	45	9.753449	10.246551	9.837608	10.162392	10.084158	9.915842	15	53
8	32	9.753495	10.246505	9.837675	10.162325	10.084180	9.915820	28	52
9	15	9.753541	10.246459	9.837743	10.162257	10.084202	9.915798	45	51
10	30	9.753587	10.246413	9.837811	10.162189	10.084224	9.915776	30	50
11	45	9.753633	10.246367	9.837878	10.162122	10.084245	9.915755	15	49
12	33	9.753679	10.246321	9.837946	10.162054	10.084267	9.915733	27	48
13	15	9.753725	10.246275	9.838014	10.161986	10.084289	9.915711	45	47
14	30	9.753771	10.246229	9.838081	10.161919	10.084311	9.915689	30	46
15	45	9.753816	10.246184	9.838149	10.161851	10.084332	9.915668	15	45
16	34	9.753862	10.246138	9.838216	10.161784	10.084354	9.915646	26	44
17	15	9.753908	10.246092	9.838284	10.161716	10.084376	9.915624	45	43
18	30	9.753954	10.246046	9.838352	10.161648	10.084398	9.915602	30	42
19	45	9.754000	10.246000	9.838419	10.161581	10.084419	9.915581	15	41
20	35	9.754046	10.245954	9.838487	10.161513	10.084441	9.915559	25	40
21	15	9.754091	10.245909	9.838554	10.161446	10.084463	9.915537	45	39
22	30	9.754137	10.245863	9.838622	10.161378	10.084485	9.915515	30	38
23	45	9.754183	10.245817	9.838689	10.161311	10.084506	9.915494	15	37
24	36	9.754229	10.245771	9.838757	10.161243	10.084528	9.915472	24	36
25	15	9.754275	10.245725	9.838825	10.161175	10.084550	9.915450	45	35
26	30	9.754320	10.245680	9.838892	10.161108	10.084572	9.915428	30	34
27	45	9.754366	10.245634	9.838960	10.161040	10.084594	9.915406	15	33
28	37	9.754412	10.245588	9.839027	10.160973	10.084615	9.915385	23	32
29	15	9.754458	10.245542	9.839095	10.160905	10.084637	9.915363	45	31
30	30	9.754503	10.245497	9.839162	10.160838	10.084659	9.915341	30	30
31	45	9.754549	10.245451	9.839230	10.160770	10.084681	9.915319	15	29
32	38	9.754595	10.245405	9.839297	10.160703	10.084703	9.915297	22	28
33	15	9.754641	10.245359	9.839365	10.160635	10.084724	9.915276	45	27
34	30	9.754686	10.245314	9.839433	10.160567	10.084746	9.915254	30	26
35	45	9.754732	10.245268	9.839500	10.160500	10.084763	9.915232	15	25
36	39	9.754778	10.245222	9.839568	10.160432	10.084790	9.915210	21	24
37	15	9.754823	10.245177	9.839635	10.160365	10.084812	9.915188	45	23
38	30	9.754869	10.245131	9.839703	10.160297	10.084834	9.915166	30	22
39	45	9.754915	10.245085	9.839770	10.160230	10.084855	9.915145	15	21
40	40	9.754960	10.245040	9.839838	10.160162	10.084877	9.915123	20	20
41	15	9.755006	10.244994	9.839905	10.160095	10.084899	9.915101	45	19
42	30	9.755052	10.244948	9.839973	10.160027	10.084921	9.915079	30	18
43	45	9.755097	10.244903	9.840040	10.159960	10.084943	9.915057	15	17
44	41	9.755143	10.244857	9.840108	10.159892	10.084965	9.915035	19	16
45	15	9.755189	10.244811	9.840175	10.159825	10.084987	9.915013	45	15
46	30	9.755234	10.244766	9.840243	10.159757	10.085008	9.914992	30	14
47	45	9.755280	10.244720	9.840310	10.159690	10.085030	9.914970	15	13
48	42	9.755326	10.244674	9.840378	10.159622	10.085052	9.914948	18	12
49	15	9.755371	10.244629	9.840445	10.159555	10.085074	9 914926	45	11
50	30	9.755417	10.244583	9.840513	10.159487	10.085096	9 914904	30	10
51	45	9.755462	10.244538	9.840580	10.159420	10.085118	9.914882	15	9
52	43	9.755508	10.244492	9.840647	10.159353	10.085140	9.914860	17	8
53	15	9.755553	10.244447	9.840715	10.159285	10.085162	9.914838	45	7
54	30	9.755599	10.244401	9.840782	10.159218	10.085183	9.914817	30	6
55	45	9.755645	10.244355	9.840850	10.159150	10.085205	9.914795	15	5
56	44	9.755690	10.244310	9.840917	10.159083	10.085227	9.914773	16	4
57	15	9.755736	10.244264	9.840985	10.159015	10.085249	9.914751	45	3
58	30	9.755781	10.244219	9.841052	10.158948	10.085271	9.914729	30	2
59	45	9.755827	10.244173	9.841120	10.158880	10.085293	9.914707	15	1
60	45	9.755872	10.244128	9.841187	10.158813	10.085315	9.914685	15	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$3^h\ 41^m$.		LOG. SINES, &c.				55 deg.		

2h 19m.			LOG. SINES, &c.				34 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec
0	45	9.755872	10.244128	9.841187	10.158813	10.085315	9.914685	15	60
1	15	9.755918	10.244082	9.841255	10.158745	10.085337	9.914663	45	59
2	30	9.755963	10.244037	9.841322	10.158678	10.085359	9.914641	30	58
3	45	9.756009	10.243991	9.841389	10.158611	10.085381	9.914619	15	57
4	46	9.756054	10.243946	9.841457	10.158543	10.085402	9.914598	14	56
5	15	9.756100	10.243900	9.841524	10.158476	10.085424	9.914576	45	55
6	30	9.756145	10.243855	9.841592	10.158408	10.085446	9.914554	30	54
7	45	9.756191	10.243809	9.841659	10.158341	10.085468	9.914532	15	53
8	47	9.756236	10.243764	9.841726	10.158274	10.085490	9.914510	13	52
9	15	9.756282	10.243718	9.841794	10.158206	10.085512	9.914488	45	51
10	30	9.756327	10.243673	9.841861	10.158139	10.085534	9.914466	30	50
11	45	9.756373	10.243627	9.841929	10.158071	10.085556	9.914444	15	49
12	48	9.756418	10.243582	9.841996	10.158004	10.085578	9.914422	12	48
13	15	9.756464	10.243536	9.842063	10.157937	10.085600	9.914400	45	47
14	30	9.756509	10.243491	9.842131	10.157869	10.085622	9.914378	30	46
15	45	9.756554	10.243446	9.842198	10.157802	10.085644	9.914356	15	45
16	49	9.756600	10.243400	9.842266	10.157734	10.085666	9.914334	11	44
17	15	9.756645	10.243355	9.842333	10.157667	10.085688	9.914312	45	43
18	30	9.756691	10.243309	9.842400	10.157600	10.085710	9.914290	30	42
19	45	9.756736	10.243264	9.842468	10.157532	10.085732	9.914268	15	41
20	50	9.756781	10.243219	9.842535	10.157465	10.085754	9.914246	10	40
21	15	9.756827	10.243173	9.842602	10.157398	10.085776	9.914224	45	39
22	30	9.756872	10.243128	9.842670	10.157330	10.085798	9.914202	30	38
23	45	9.756918	10.243082	9.842737	10.157263	10.085820	9 914180	15	37
24	51	9.756963	10.243037	9.842805	10.157195	10.085842	9.914158	9	36
25	15	9.757008	10.242992	9.842872	10.157128	10.085864	9.914136	45	35
26	30	9.757054	10.242946	9 842939	10.157061	10.085886	9.914114	30	34
27	45	9.757099	10.242901	9.843007	10.156993	10.085908	9.914092	15	33
28	52	9.757144	10.242856	9.843074	10.156926	10.085930	9.914070	8	32
29	15	9.757190	10.242810	9.843141	10.156859	10.085952	9.914048	45	31
30	30	9.757235	10.242765	9.843209	10.156791	10.085974	9.914026	30	30
31	45	9.757280	10.242720	9 843276	10.156724	10.085996	9.914004	15	29
32	53	9.757326	10.242674	9.843343	10.156657	10.086018	9.913982	7	28
33	15	9.757371	10 242629	9.843411	10.156589	10.086040	9.913960	45	27
34	30	9.757416	10.242584	9.843478	10.156522	10.086062	9.913938	30	26
35	45	9.757461	10.242539	9.843545	10.156455	10.086084	9.913916	15	25
36	54	9.757507	10.242493	9.843612	10.156388	10.086106	9.913894	6	24
37	15	9.757552	10.242448	9.843680	10.156320	10.086128	9.913872	45	23
38	30	9.757597	10.242403	9.843747	10.156253	10.086150	9.913850	30	22
39	45	9.757643	10.242357	9.843814	10.156186	10.086172	9.913828	15	21
40	55	9.757688	10.242312	9.843882	10.156118	10.086194	9.913806	5	20
41	15	9.757733	10.242267	9.843949	10.156051	10.086216	9.913784	45	19
42	30	9.757778	10.242222	9.844016	10.155984	10.086238	9.913762	30	18
43	45	9.757823	10.242177	9.844083	10.155917	10.086260	9.913740	15	17
44	56	9.757869	10.242131	9.844151	10.155849	10.086282	9.913718	4	16
45	15	9.757914	10.242086	9.844218	10.155782	10.086304	9.913696	45	15
46	30	9.757959	10.242041	9.844285	10.155715	10.086326	9.913674	30	14
47	45	9.758004	10.241996	9.844353	10.155647	10.086348	9.913652	15	13
48	57	9.758049	10.241951	9.844420	10.155580	10.086370	9.913630	3	12
49	15	9.758095	10.241905	9.844487	10.155513	10.086392	9.913608	45	11
50	30	9.758140	10.241860	9.844554	10.155446	10.086415	9.913585	30	10
51	45	9.758185	10.241815	9.844622	10.155378	10.086437	9.913563	15	9
52	58	9.758230	10.241770	9.844689	10.155311	10.086459	9.913541	2	8
53	15	9.758275	10.241725	9.844756	10.155244	10.086481	9.913519	45	7
54	30	9.758320	10.241680	9.844823	10.155177	10.086503	9.913497	30	6
55	45	9.758366	10.241634	9.844891	10.155109	10 086525	9.913475	15	5
56	59	9.758411	10.241589	9.844958	10.155042	10.086547	9.913453	1	4
57	15	9.758456	10.241544	9.845025	10.154975	10.086569	9.913431	45	3
58	30	9.758501	10.241499	9.845092	10.154908	10.086591	9.913409	30	2
59	45	9.758546	10.241454	9.845160	10.154840	10.086613	9.913387	15	1
60	60	9.758591	10.241409	9.845227	10.154773	10.086636	9.913364	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
3h 40m.			LOG. SINES, &c.				55 deg.		

2h 20m.			LOG. SINES, &c.				35 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	0	9.758591	10.241409	9.845227	10.154773	10.086636	9.913364	60	60
1	15	9.758636	10.241364	9.845294	10.154706	10.086658	9.913342	45	59
2	30	9.758681	10.241319	9.845361	10.154639	10.086680	9.913320	30	58
3	45	9.758727	10.241273	9.845428	10.154572	10.086702	9.913298	15	57
4	1	9.758772	10.241228	9.845496	10.154504	10.086724	9.913276	59	56
5	15	9.758817	10.241183	9.845563	10.154437	10.086746	9.913254	45	55
6	30	9.758862	10.241138	9.845630	10.154370	10.086768	9.913232	30	54
7	45	9.758907	10.241093	9.845697	10.154303	10.086790	9.913210	15	53
8	2	9.758952	10.241048	9.845764	10.154236	10.086813	9.913187	58	52
9	15	9.758997	10.241003	9.845832	10.154168	10.086835	9.913165	45	51
10	30	9.759042	10.240958	9.845899	10.154101	10.086857	9.913143	30	50
11	45	9.759087	10.240913	9.845966	10.154034	10.086879	9.913121	15	49
12	3	9.759132	10.240868	9.846033	10.153967	10 086901	9.913099	57	48
13	15	9.759177	10.240823	9.846100	10.153900	10.086923	9.913077	45	47
14	30	9.759222	10.240778	9.846167	10.153833	10.086945	9.913055	30	46
15	45	9.759267	10.240733	9.846235	10.153765	10.086968	9.913032	15	45
16	4	9.759312	10.240688	9.846302	10.153698	10.086990	9.913010	56	44
17	15	9.759357	10.240643	9.846369	10.153631	10.087012	9.912988	45	43
18	30	9.759402	10.240598	9.846436	10.153564	10.087034	9.912966	30	42
19	45	9.759447	10.240553	9.846503	10.153497	10.087056	9.912944	15	41
20	5	9.759492	10.240508	9.846570	10.153430	10.087079	9.912921	55	40
21	15	9.759537	10.240463	9.846638	10.153362	10.087101	9.912899	45	39
22	30	9.759582	10.240418	9.846705	10.153295	10.087123	9.912877	30	38
23	45	9.759627	10.240373	9.846772	10.153228	10.087145	9.912855	15	37
24	6	9.759672	10.240328	9.846839	10.153161	10.087167	9.912833	54	36
25	15	9.759717	10.240283	9.846906	10.153094	10.087189	9.912811	45	35
26	30	9.759762	10.240238	9.846973	10.153027	10.087212	9.912788	30	34
27	45	9.759807	10.240193	9.847040	10.152960	10.087234	9.912766	15	33
28	7	9.759851	10.240149	9.847107	10.152893	10.087256	9.912744	53	32
29	15	9.759896	10.240104	9.847175	10.152825	10 087278	9.912722	45	31
30	30	9.759941	10.240059	9.847242	10.152758	10.087301	9.912699	30	30
31	45	9.759986	10.240014	9.847309	10.152691	10.087323	9.912677	15	29
32	8	9.760031	10.239969	9.847376	10.152624	10.087345	9.912655	52	28
33	15	9.760076	10.239924	9.847443	10.152557	10.087367	9.912633	45	27
34	30	9.760121	10.239879	9.847510	10.152490	10.087389	9.912611	30	26
35	45	9.760166	10.239834	9.847577	10.152423	10.087412	9.912588	15	25
36	9	9.760211	10 239789	9.847644	10.152356	10.087434	9.912566	51	24
37	15	9.760255	10.239745	9.847711	10.152289	10.087456	9.912544	45	23
38	30	9.760300	10.239700	9.847779	10.152221	10.087478	9.912522	30	22
39	45	9.760345	10.239655	9.847846	10.152154	10.087501	9.912499	15	21
40	10	9.760390	10.239610	9.847913	10.152087	10.087523	9.912477	50	20
41	15	9.760435	10.239565	9.847980	10.152020	10.087545	9.912455	45	19
42	30	9.760480	10.239520	9.848047	10.151953	10.087567	9.912433	30	18
43	45	9 760524	10.239476	9.848114	10.151886	10.087590	9 912410	15	17
44	11	9.760569	10.239431	9.848181	10.151819	10.087612	9.912388	49	16
45	15	9.760614	10.239386	9.848248	10.151752	10.087634	9.912366	45	15
46	30	9.760659	10.239341	9.848315	10.151685	10.087656	9.912344	30	14
47	45	9.760703	10.239297	9.848382	10.151618	10 087679	9.912321	15	13
48	12	9.760748	10.239252	9.848449	10.151551	10.087701	9.912299	48	12
49	15	9.760793	10.239207	9.848516	10.151484	10.087723	9.912277	45	11
50	30	9.760838	10.239162	9.848583	10.151417	10.087746	9.912254	30	10
51	45	9.760883	10 239117	9.848650	10.151350	10.087768	9.912232	15	9
52	13	9 760927	10.239073	9.848717	10.151283	10 087790	9.912210	47	8
53	15	9.760972	10.239028	9.848784	10.151216	10.087812	9.912188	45	7
54	30	9.761017	10.238983	9.848851	10.151149	10.087835	9.912165	30	6
55	45	9.761062	10.238938	9.848918	10.151082	10.087857	9.912143	15	5
56	14	9.761106	10.238894	9.848985	10.151015	10.087879	9.912121	46	4
57	15	9 761151	10.238849	9.849053	10.150947	10.087902	9.912098	45	3
58	30	9.761196	10.238804	9.849120	10.150880	10.087924	9.912076	30	2
59	45	9.761240	10.238760	9.849187	10.150813	10.087946	9.912054	15	1
60	15	9.761285	10.238715	9.849254	10.150746	10.087969	9.912031	45	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
3h 3m.			LOG. SINES, &c.				54 deg		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	2h 21m.		LOG. SINES, &c.				35 deg.		
0	15	9.761285	10.238715	9.849254	10.150746	10.087969	9.912031	45	60
1	15	9.761330	10.238670	9.849321	10.150679	10.087991	9.912009	45	59
2	30	9.761374	10.238626	9.849388	10.150612	10.088013	9.911987	30	58
3	45	9.761419	10.238581	9.849455	10.150545	10.088036	9.911964	15	57
4	16	9.761464	10.238536	9.849522	10.150478	10.088058	9.911942	44	56
5	15	9.761508	10.238492	9.849589	10.150411	10.088080	9.911920	45	55
6	30	9.761553	10.238447	9.849656	10.150344	10.088103	9.911897	30	54
7	45	9.761598	10.238402	9.849723	10.150277	10.088125	9.911875	15	53
8	17	9.761642	10.238358	9.849790	10.150210	10.088147	9.911853	43	52
9	15	9.761687	10.238313	9.849856	10.150144	10.088170	9.911830	45	51
10	30	9 761732	10.238268	9.849923	10.150077	10.088192	9.911808	30	50
11	45	9.761776	10.238224	9.849990	10.150010	10.088214	9.911786	15	49
12	18	9 761821	10.238179	9.850057	10.149943	10.088237	9.911763	42	48
13	15	9.761865	10.238135	9.850124	10.149876	10.088259	9.911741	45	47
14	30	9.761910	10.238090	9.850191	10.149809	10.088281	9.911719	30	46
15	45	9.761955	10.238045	9 850258	10.149742	10.088304	9.911696	15	45
16	19	9.761999	10.238001	9.850325	10.149675	10.088326	9.911674	41	44
17	15	9.762044	10.237956	9.850392	10.149608	10 088349	9.911651	45	43
18	30	9.762088	10.237912	9.850459	10.149541	10.088371	9.911629	30	42
19	45	9.762133	10.237867	9.850526	10.149474	10.088393	9.911607	15	41
20	20	9.762177	10.237823	9.850593	10.149407	10.088416	9.911584	40	40
21	15	9.762222	10.237778	9.850660	10.149340	10.088438	9.911562	45	39
22	30	9 762267	10.237733	9.850727	10.149273	10.088460	9.911540	30	38
23	45	9.762311	10.237689	9.850794	10.149206	10.088483	9.911517	15	37
24	21	9.762356	10.237644	9.850861	10.149139	10.088505	9.911495	39	36
25	15	9.762400	10.237600	9.850928	10.149072	10.088528	9.911472	45	35
26	30	9.762445	10.237555	9.850995	10.149005	10.088550	9.911450	30	34
27	45	9.762489	10.237511	9.851062	10.148938	10.088572	9.911428	15	33
28	22	9 762534	10.237466	9.851128	10.148872	10.088595	9.911405	38	32
29	15	9.762578	10.237422	9.851195	10.148805	10.088617	9.911383	45	31
30	30	9.762623	10.237377	9.851262	10.148738	10.088640	9.911360	30	30
31	45	9.762667	10.237333	9.851329	10.148671	10.088662	9.911338	15	29
32	23	9.762712	10.237288	9.851396	10 148604	10.088685	9.911315	37	28
33	15	9.762756	10.237244	9.851463	10.148537	10.088707	9.911293	45	27
34	30	9.762800	10.237200	9.851530	10.148470	10.088729	9.911271	30	26
35	45	9.762845	10.237155	9.851597	10 148403	10.088752	9.911248	15	25
36	24	9.762889	10.237111	9.851664	10.148336	10.088774	9.911226	36	24
37	15	9.762934	10.237066	9.851731	10.148269	10.088797	9.911203	45	23
38	30	9.762978	10.237022	9.851797	10.148203	10.088819	9.911181	30	22
39	45	9.763023	10.236977	9.851864	10.148136	10.088842	9.911158	15	21
40	25	9.763067	10.236933	9.851931	10.148069	10.088864	9.911136	35	20
41	15	9.763111	10.236889	9.851998	10.148002	10.088887	9.911113	45	19
42	30	9.763156	10.236844	9 852065	10.147935	10.088909	9.911091	30	18
43	45	9.763200	10.236800	9.852132	10 147868	10.088932	9.911068	15	17
44	26	9.763245	10.236755	9.852199	10.147801	10.088954	9.911046	34	16
45	15	9.763289	10.236711	9.852265	10.147735	10.088976	9.911024	45	15
46	30	9.763333	10.236667	9.852332	10.147668	10.088999	9.911001	30	14
47	45	9.763378	10.236622	9.852399	10.147601	10.089021	9.910979	15	13
48	27	9.763422	10.236578	9.852466	10.147534	10.089044	9.910956	33	12
49	15	9.763467	10.236533	9.852533	10.147467	10 089066	9.910934	45	11
50	30	9.763511	10.236489	9.852600	10.147400	10.089089	9.910911	30	10
51	45	9.763555	10.236445	9.852667	10.147333	10.089111	9.910889	15	9
52	28	9.763600	10.236400	9.852733	10.147267	10.089134	9.910866	32	8
53	15	9.763644	10.236356	9.852800	10.147200	10.089156	9.910844	45	7
54	30	9.763688	10.236312	9.852867	10.147133	10.089179	9.910821	30	6
55	45	9.763733	10.236267	9.852934	10.147066	10.089201	9.910799	15	5
56	29	9.763777	10.236223	9.853001	10.146999	10.089224	9.910776	31	4
57	15	9.763821	10.236179	9.853068	10.146932	10.089246	9.910754	45	3
58	30	9.763865	10.236135	9.853134	10.146866	10.089269	9.910731	30	2
59	45	9.763910	10.236090	9.853201	10.146799	10.089291	9.910709	15	1
60	30	9.763954	10.236046	9.853268	10.146732	10.089314	9.910686	30	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	3h 38m.		LOG. SINES, &c.				54 deg.		

2h 22m.			LOG. SINES, &c.				35 deg.		
sec.	′ ′	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	30	9.763954	10.236046	9.853268	10.146732	10.089314	9.910686	30	60
1	15	9.763998	10.236002	9.853335	10.146665	10.089337	9.910663	45	59
2	30	9.764043	10.235957	9.853402	10.146598	10.089359	9.910641	30	58
3	45	9.764087	10.235913	9.853468	10.146532	10.089382	9.910618	15	57
4	31	9.764131	10.235869	9.853535	10.146465	10.089404	9.910596	29	56
5	15	9.764175	10.235825	9.853602	10.146398	10 089427	9.910573	45	55
6	30	9.764220	10.235780	9.853669	10.146331	10.089449	9.910551	30	54
7	45	9.764264	10.235736	9.853736	10.146264	10.089472	9.910528	15	53
8	32	9.764308	10.235692	9.853802	10.146198	10.089494	9.910506	28	52
9	15	9.764352	10.235648	9.853869	10.146131	10.089517	9.910483	45	51
10	30	9.764396	10.235604	9.853936	10.146064	10.089539	9.910461	30	50
11	45	9.764441	10.235559	9.854003	10.145997	10.089562	9.910438	15	49
12	33	9.764485	10.235515	9.854069	10.145931	10.089585	9.910415	27	48
13	15	9.764529	10.235471	9.854136	10.145864	10.089607	9.910393	45	47
14	30	9.764573	10.235427	9.854203	10.145797	10.089630	9.910370	30	46
15	45	9.764617	10.235383	9.854270	10.145730	10.089652	9.910348	15	45
16	34	9.764662	10.235338	9.854336	10.145664	10.089675	9.910325	26	44
17	15	9.764706	10.235294	9.854403	10.145597	10.089697	9.910303	45	43
18	30	9.764750	10.235250	9.854470	10.145530	10.089720	9.910280	30	42
19	45	9.764794	10.235206	9.854537	10.145463	10.089743	9.910257	15	41
20	35	9.764838	10.235162	9.854603	10.145397	10.089765	9.910235	25	40
21	15	9.764882	10.235118	9.854670	10.145330	10.089788	9.910212	45	39
22	30	9.764926	10.235074	9.854737	10.145263	10.089810	9.910190	30	38
23	45	9.764971	10.235029	9.854804	10.145196	10.089833	9.910167	15	37
24	36	9.765015	10.234985	9.854870	10.145130	10.089856	9.910144	24	36
25	15	9.765059	10.234941	9.854937	10.145063	10.089878	9.910122	45	35
26	30	9.765103	10.234897	9.855004	10.144996	10.089901	9.910099	30	34
27	45	9.765147	10.234853	9.855070	10.144930	10.089924	9.910076	15	33
28	37	9.765191	10.234809	9.855137	10.144863	10.089946	9 910054	23	32
29	15	9.765235	10.234765	9.855204	10.144796	10.089969	9.910031	45	31
30	30	9.765279	10.234721	9.855271	10.144729	10.089991	9.910009	30	30
31	45	9.765323	10.234677	9.855337	10.144663	10.090014	9.909986	15	29
32	38	9.765367	10.234633	9.855404	10.144596	10.090037	9.909963	22	28
33	15	9.765411	10.234589	9.855471	10.144529	10.090059	9.909941	45	27
34	30	9.765455	10.234545	9.855537	10.144463	10.090082	9.909918	30	26
35	45	9.765500	10.234500	9.855604	10.144396	10.090105	9.909895	15	25
36	39	9.765544	10.234456	9.855671	10.144329	10.090127	9.909873	21	24
37	15	9.765588	10.234412	9.855737	10.144263	10.090150	9.909850	45	23
38	30	9.765632	10.234368	9.855804	10.144196	10.090173	9.909827	30	22
39	45	9.765676	10.234324	9.855871	10.144129	10.090195	9.909805	15	21
40	40	9.765720	10.234280	9.855938	10.144062	10.090218	9.909782	20	20
41	15	9.765764	10.234236	9.856004	10.143996	10.090241	9.909759	45	19
42	30	9.765808	10.234192	9.856071	10.143929	10.090263	9.909737	30	18
43	45	9.765852	10.234148	9.856138	10.143862	10.090286	9.909714	15	17
44	41	9.765896	10.234104	9.856204	10.143796	10.090309	9.909691	19	16
45	15	9.765940	10.234060	9.856271	10.143729	10.090331	9.909669	45	15
46	30	9.765984	10.234016	9.856337	10.143663	10.090354	9.909646	30	14
47	45	9.766028	10.233972	9.856404	10.143596	10.090377	9.909623	15	13
48	42	9.766071	10.233929	9.856471	10.143529	10.090399	9.909601	18	12
49	15	9.766115	10.233885	9.856537	10.143463	10.090422	9.909578	45	11
50	30	9.766159	10.233841	9.856604	10.143396	10.090445	9.909555	30	10
51	45	9.766203	10.233797	9.856671	10.143329	10.090467	9.909533	15	9
52	43	9.766247	10.233753	9.856737	10.143263	10.090490	9.909510	17	8
53	15	9.766291	10.233709	9.856804	10.143196	10.090513	9.909487	45	7
54	30	9.766335	10.233665	9.856871	10.143129	10.090536	9.909464	30	6
55	45	9.766379	10.233621	9.856937	10.143063	10.090558	9.909442	15	5
56	44	9.766423	10.233577	9.857004	10.142996	10.090581	9.909419	16	4
57	15	9.766467	10.233533	9.857070	10.142930	10.090604	9.909396	45	3
58	30	9.766511	10.233489	9.857137	10.142863	10.090626	9.909374	30	2
59	45	9.766555	10.233445	9.857204	10.142796	10.090649	9.909351	15	1
60	45	9.766598	10.233402	9.857270	10.142730	10.090672	9.909328	15	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
3h 37m.			LOG. SINES, &c.				54 deg.		

2h 23m.			LOG. SINES, &c.				35 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	45	9.766598	10.233402	9.857270	10.142730	10.090672	9.909328	15	60
1	15	9.766642	10.233358	9.857337	10.142663	10.090695	9.909305	45	59
2	30	9.766686	10.233314	9.857404	10.142596	10.090717	9.909283	30	58
3	45	9.766730	10.233270	9.857470	10.142530	10.090740	9.909260	15	57
4	46	9.766774	10.233226	9.857537	10.142463	10.090763	9.909237	14	56
5	15	9.766818	10.233182	9.857603	10.142397	10.090786	9.909214	45	55
6	30	9.766862	10.233138	9.857670	10.142330	10.090808	9.909192	30	54
7	45	9.766905	10.233095	9.857736	10.142264	10.090831	9.909169	15	53
8	47	9 766949	10.233051	9.857803	10.142197	10.090854	9.909146	13	52
9	15	9.766993	10.233007	9.857870	10.142130	10.090877	9.909123	45	51
10	30	9.767037	10.232963	9.857936	10.142064	10.090899	9.909101	30	50
11	45	9.767081	10.232919	9.858003	10 141997	10.090922	9.909078	15	49
12	48	9.767124	10.232876	9.858069	10.141931	10.090945	9.909055	12	48
13	15	9.767168	10 232832	9.858136	10.141864	10.090968	9.909032	45	47
14	30	9.767212	10.232788	9.858202	10.141798	10.090991	9.909009	30	46
15	45	9.767256	10.232744	9.858269	10.141731	10.091013	9.908987	15	45
16	49	9.767300	10.232700	9.858336	10.141664	10.091036	9.908964	11	44
17	15	9.767343	10.232657	9.858402	10.141598	10.091059	9.908941	45	43
18	30	9.767387	10.232613	9.858469	10.141531	10.091082	9.908918	30	42
19	45	9.767431	10.232569	9.858535	10.141465	10.091105	9.908895	15	41
20	50	9.767475	10.232525	9.858602	10.141398	10.091127	9.908873	10	40
21	15	9 767518	10.232482	9.858668	10.141332	10.091150	9.908850	45	39
22	30	9.767562	10.232438	9.858735	10.141265	10.091173	9.908827	30	38
23	45	9.767606	10.232394	9.858801	10.141199	10.091196	9.908804	15	37
24	51	9.767649	10.232351	9.858868	10.141132	10.091219	9.908781	9	36
25	15	9.767693	10.232307	9.858934	10.141066	10.091241	9.908759	45	35
26	30	9.767737	10.232263	9.859001	10.140999	10.091264	9.908736	30	34
27	45	9.767780	10.232220	9.859068	10.140932	10.091287	9.908713	15	33
28	52	9.767824	10.232176	9.859134	10.140866	10.091310	9.908690	8	32
29	15	9 767868	10.232132	9.859201	10.140799	10.091333	9.908667	45	31
30	30	9.767912	10.232088	9.859267	10.140733	10.091356	9.908644	30	30
31	45	9.767955	10.232045	9.859334	10.140666	10.091378	9.908622	15	29
32	53	9 767999	10.232001	9.859400	10.140600	10.091401	9.908599	7	28
33	15	9.768043	10.231957	9.859467	10.140533	10.091424	9.908576	45	27
34	30	9.768086	10.231914	9.859533	10.140467	10.091447	9.908553	30	26
35	45	9.768130	10.231870	9.859600	10.140400	10.091470	9.908530	15	25
36	54	9.768173	10.231827	9.859666	10.140334	10.091493	9.908507	6	24
37	15	9.768217	10.231783	9.859733	10.140267	10.091516	9.908484	45	23
38	30	9.768261	10.231739	9.859799	10.140201	10.091538	9.908462	30	22
39	45	9.768304	10.231696	9.859866	10.140134	10.091561	9.908439	15	21
40	55	9.768348	10.231652	9.859932	10.140068	10.091584	9.908416	5	20
41	15	9.768392	10.231608	9.859999	10.140001	10.091607	9.908393	45	19
42	30	9.768435	10.231565	9.860065	10.139935	10.091630	9.908370	30	18
43	45	9.768479	10.231521	9.860131	10.139869	10.091653	9.908347	15	17
44	56	9.768522	10.231478	9.860198	10.139802	10.091676	9.908324	4	16
45	15	9.768566	10.231434	9.860264	10.139736	10.091699	9.908301	45	15
46	30	9.768609	10.231391	9.860331	10.139669	10.091722	9.908278	30	14
47	45	9.768653	10.231347	9.860397	10.139603	10.091744	9.908256	15	13
48	57	9.768697	10.231303	9.860464	10.139536	10.091767	9.908233	3	12
49	15	9.768740	10.231260	9.860530	10.139470	10.091790	9.908210	45	11
50	30	9.768784	10.231216	9.860597	10.139403	10.091813	9.908187	30	10
51	45	9.768827	10.231173	9.860663	10.139337	10.091836	9.908164	15	9
52	58	9.768871	10.231129	9.860730	10.139270	10.091859	9.908141	2	8
53	15	9.768914	10.231086	9.860796	10.139204	10.091882	9.908118	45	7
54	30	9.768958	10.231042	9.860862	10.139138	10.091905	9.908095	30	6
55	45	9.769001	10.230999	9.860929	10.139071	10.091928	9.908072	15	5
56	59	9.769045	10.230955	9.860995	10.139005	10.091951	9 908049	1	4
57	15	9.769088	10.230912	9.861062	10.138938	10.091974	9.908026	45	3
58	30	9.769132	10.230868	9.861128	10.138872	10.091997	9.908003	30	2
59	45	9.769175	10.230825	9.861195	10.138805	10.092019	9.907981	15	1
60	60	9.769219	10.230781	9.861261	10.138739	10.092042	9.907958	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
3h 36m.			LOG. SINES, &c.				54 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	$2^h\ 24^m$.		LOG. SINES, &C.				36 deg.		
0	0	9.769219	10.230781	9.861261	10.138739	10.092042	9.907958	60	60
1	15	9.769262	10.230738	9.861327	10.138673	10.092065	9.907935	45	59
2	30	9.769306	10.230694	9.861394	10.138606	10.092088	9.907912	30	58
3	45	9.769349	10.230651	9.861460	10.138540	10.092111	9.907889	15	57
4	1	9.769392	10.230608	9.861527	10.138473	10.092134	9 907866	59	56
5	15	9.769436	10.230564	9.861593	10.138407	10.092157	9.907843	45	55
6	30	9.769479	10.230521	9.861659	10.138341	10.092180	9.907820	30	54
7	45	9.769523	10.230477	9.861726	10.138274	10.092203	9.907797	15	53
8	2	9.769566	10.230434	9.861792	10.138208	10.092226	9.907774	58	52
9	15	9.769610	10.230390	9.861859	10.138141	10.092249	9.907751	45	51
10	30	9.769653	10.230347	9.861925	10.138075	10.092272	9.907728	30	50
11	45	9.769696	10.230304	9.861991	10.138009	10.092295	9.907705	15	49
12	3	9.769740	10.230260	9.862058	10.137942	10.092318	9.907682	57	48
13	15	9.769783	10.230217	9.862124	10.137876	10.092341	9.907659	45	47
14	30	9.769827	10.230173	9.862191	10.137809	10.092364	9.907636	30	46
15	45	9.769870	10.230130	9.862257	10.137743	10.092387	9.907613	15	45
16	4	9.769913	10.230087	9.862323	10.137677	10.092410	9.907590	56	44
17	15	9.769957	10.230043	9.862390	10.137610	10.092433	9.907567	45	43
18	30	9.770000	10.230000	9.862456	10.137544	10.092456	9.907544	30	42
19	45	9.770043	10.229957	9.862522	10.137478	10.092479	9.907521	15	41
20	5	9.770087	10.229913	9.862589	10.137411	10.092502	9.907498	55	40
21	15	9.770130	10.229870	9.862655	10.137345	10.092525	9.907475	45	39
22	30	9.770173	10.229827	9.862721	10.137279	10.092548	9.907452	30	38
23	45	9.770217	10.229783	9.862788	10.137212	10.092571	9.907429	15	37
24	6	9.770260	10.229740	9.862854	10.137146	10.092594	9.907406	54	36
25	15	9.770303	10.229697	9.862920	10.137080	10.092617	9.907383	45	35
26	30	9.770347	10.229653	9.862987	10.137013	10.092640	9.907360	30	34
27	45	9.770390	10.229610	9.863053	10.136947	10.092663	9.907337	15	33
28	7	9.770433	10.229567	9.863119	10.136881	10.092686	9.907314	53	32
29	15	9.770476	10.229524	9.863186	10.136814	10.092709	9.907291	45	31
30	30	9.770520	10.229480	9.863252	10.136748	10.092732	9.907268	30	30
31	45	9.770563	10.229437	9.863318	10.136682	10.092755	9.907245	15	29
32	8	9.770606	10.229394	9.863385	10 136615	10.092778	9.907222	52	28
33	15	9.770650	10.229350	9.863451	10.136549	10.092802	9.907198	45	27
34	30	9.770693	10.229307	9.863517	10.136483	10.092825	9.907175	30	26
35	45	9.770736	10.229264	9.863584	10.136416	10.092848	9.907152	15	25
36	9	9.770779	10.229221	9.863650	10.136350	10.092871	9.907129	51	24
37	15	9.770822	10.229178	9.863716	10.136284	10.092894	9.907106	45	23
38	30	9.770866	10.229134	9.863783	10.136217	10.092917	9.907083	30	22
39	45	9.770909	10.229091	9.863849	10.136151	10.092940	9.907060	15	21
40	10	9.770952	10.229048	9.863915	10.136085	10.092963	9.907037	50	20
41	15	9.770995	10.229005	9.863981	10.136019	10.092986	9.907014	45	19
42	30	9.771039	10.228961	9.864048	10.135952	10.093009	9.906991	30	18
43	45	9.771082	10.228918	9.864114	10.135886	10.093032	9.906968	15	17
44	11	9.771125	10.228875	9.864180	10.135820	10.093055	9.906945	49	16
45	15	9.771168	10.228832	9.864247	10.135753	10.093079	9.906921	45	15
46	30	9.771211	10.228789	9.864313	10.135687	10.093102	9.906898	30	14
47	45	9.771254	10.228746	9.864379	10.135621	10.093125	9.906875	15	13
48	12	9.771298	10.228702	9.864445	10.135555	10.093148	9.906852	48	12
49	15	9.771341	10.228659	9.864512	10.135488	10.093171	9.906829	45	11
50	30	9.771384	10.228616	9.864578	10.135422	10.093194	9.906806	30	10
51	45	9.771427	10.228573	9.864644	10.135356	10.093217	9.906783	15	9
52	13	9.771470	10.228530	9.864710	10.135290	10.093240	9.906760	47	8
53	15	9.771513	10.228487	9.864777	10.135223	10.093263	9.906737	45	7
54	30	9.771556	10.228444	9.864843	10.135157	10.093287	9.906713	30	6
55	45	9.771599	10.228401	9.864909	10.135091	10.093310	9.906690	15	5
56	14	9.771643	10.228357	9.864975	10.135025	10.093333	9.906667	46	4
57	15	9.771686	10.228314	9.865042	10.134958	10.093356	9.906644	45	3
58	30	9.771729	10.228271	9.865108	10.134892	10.093379	9.906621	30	2
59	45	9.771772	10.228228	9.865174	10.134826	10.093402	9.906508	15	1
60	15	9.771815	10.228185	9 865240	10.134760	10.093426	9.906574	45	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$3^h\ 35^m$.		LOG. SINES, &c.				53 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	$2^h\ 25^m$.		LOG. SINES, &c.				36 deg.		
0	15	9.771815	10.228185	9.865240	10.134760	10.093426	9.906574	45	60
1	15	9.771858	10.228142	9.865307	10.134693	10.093449	9.906551	45	59
2	30	9.771901	10.228099	9.865373	10.134627	10.093472	9.906528	30	58
3	45	9.771944	10.228056	9.865439	10.134561	10.093495	9.906505	15	57
4	16	9.771987	10.228013	9.865505	10.134495	10.093518	9.906482	44	56
5	15	9.772030	10.227970	9.865571	10.134429	10.093541	9.906459	45	55
6	30	9.772073	10.227927	9.865638	10.134362	10.093565	9.906435	30	54
7	45	9.772116	10.227884	9.865704	10.134296	10.093588	9.906412	15	53
8	17	9.772159	10.227841	9.865770	10.134230	10.093611	9.906389	43	52
9	15	9.772202	10.227798	9.865836	10.134164	10.093634	9.906366	45	51
10	30	9.772245	10.227755	9.865903	10.134097	10.093657	9.906343	30	50
11	45	9.772288	10.227712	9.865969	10.134031	10.093680	9.906320	15	49
12	18	9.772331	10.227669	9.866035	10.133965	10.093704	9.906296	42	48
13	15	9.772374	10.227626	9.866101	10.133899	10.093727	9.906273	45	47
14	30	9.772417	10.227583	9.866167	10.133833	10.093750	9.906250	30	46
15	45	9.772460	10.227540	9.866233	10.133767	10.093773	9.906227	15	45
16	19	9.772503	10.227497	9.866300	10.133700	10.093796	9.906204	41	44
17	15	9.772546	10.227454	9.866366	10.133634	10.093820	9.906180	45	43
18	30	9.772589	10.227411	9.866432	10.133568	10.093843	9.906157	30	42
19	45	9.772632	10.227368	9.866498	10.133502	10.093866	9.906134	15	41
20	20	9.772675	10.227325	9.866564	10.133436	10.093889	9.906111	40	40
21	15	9.772718	10.227282	9.866631	10.133369	10.093913	9.906087	45	39
22	30	9.772761	10.227239	9.866697	10.133303	10.093936	9.906064	30	38
23	45	9.772804	10.227196	9.866763	10.133237	10.093959	9.906041	15	37
24	21	9.772847	10.227153	9.866829	10.133171	10.093982	9.906018	39	36
25	15	9.772890	10.227110	9.866895	10.133105	10.094006	9.905994	45	35
26	30	9.772933	10.227067	9.866961	10.133039	10.094029	9.905971	30	34
27	45	9.772976	10.227024	9.867028	10.132972	10.094052	9.905948	15	33
28	22	9.773018	10.226982	9.867094	10.132906	10.094075	9.905925	38	32
29	15	9.773061	10.226939	9.867160	10.132840	10.094099	9.905901	45	31
30	30	9.773104	10.226896	9.867226	10.132774	10.094122	9.905878	30	30
31	45	9.773147	10.226853	9.867292	10.132708	10.094145	9.905855	15	29
32	23	9.773190	10.226810	9.867358	10.132642	10.094168	9.905832	37	28
33	15	9.773233	10.226767	9.867424	10.132576	10.094192	9.905808	45	27
34	30	9.773276	10.226724	9.867490	10.132510	10.094215	9.905785	30	26
35	45	9.773318	10.226682	9.867557	10.132443	10.094238	9.905762	15	25
36	24	9.773361	10.226639	9.867623	10.132377	10.094261	9.905739	36	24
37	15	9.773404	10.226596	9.867689	10.132311	10.094285	9.905715	45	23
38	30	9.773447	10.226553	9.867755	10.132245	10.094308	9.905692	30	22
39	45	9.773490	10.226510	9.867821	10.132179	10.094331	9.905669	15	21
40	25	9.773533	10.226467	9.867887	10.132113	10.094355	9.905645	35	20
41	15	9.773575	10.226425	9.867953	10.132047	10.094378	9.905622	45	19
42	30	9.773618	10.226382	9.868019	10.131981	10.094401	9.905599	30	18
43	45	9.773661	10.226339	9.868086	10.131914	10.094425	9.905575	15	17
44	26	9.773704	10.226296	9.868152	10.131848	10.094448	9.905552	34	16
45	15	9.773747	10.226253	9.868218	10.131782	10.094471	9.905529	45	15
46	30	9.773789	10.226211	9.868284	10.131716	10.094494	9.905506	30	14
47	45	9.773832	10.226168	9.868350	10.131650	10.094518	9.905482	15	13
48	27	9.773875	10.226125	9.868416	10.131584	10.094541	9.905459	33	12
49	15	9.773918	10.226082	9.868482	10.131518	10.094564	9.905436	45	11
50	30	9.773960	10.226040	9.868548	10.131452	10.094588	9.905412	30	10
51	45	9.774003	10.225997	9.868614	10.131386	10.094611	9.905389	15	9
52	28	9.774046	10.225954	9.868680	10.131320	10.094634	9.905366	32	8
53	15	9.774089	10.225911	9.868746	10.131254	10.094658	9.905342	45	7
54	30	9.774131	10.225869	9.868812	10.131188	10.094681	9.905319	30	6
55	45	9.774174	10.225826	9.868879	10.131121	10.094705	9.905295	15	5
56	29	9.774217	10.225783	9.868945	10.131055	10.094728	9.905272	31	4
57	15	9.774259	10.225741	9.869011	10.130989	10.094751	9.905249	45	3
58	30	9.774302	10.225698	9.869077	10.130923	10.094775	9.905225	30	2
59	45	9.774345	10.225655	9.869143	10.130857	10.094798	9.905202	15	1
60	30	9.774388	10.225612	9.869209	10.130791	10.094821	9.905179	30	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$3^h\ 34^m$.		LOG. SINES, &c.				53 deg.		

$2^h\ 26^m$.			LOG. SINES, &c.				36 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	30	9.774388	10.225612	9.869209	10 130791	10.094821	9.905179	30	60
1	15	9.774430	10.225570	9.869275	10.130725	10.094845	9.905155	45	59
2	30	9.774473	10.225527	9.869341	10.130659	10.094868	9.905132	30	58
3	45	9.774516	10.225484	9.869407	10.130593	10.094891	9.905109	15	57
4	31	9.774558	10.225442	9.869473	10.130527	10.094915	9.905085	29	56
5	15	9.774601	10.225399	9.869539	10.130461	10.094938	9.905062	45	55
6	30	9.774644	10.225356	9.869605	10.130395	10.094962	9.905038	30	54
7	45	9.774686	10.225314	9.869671	10.130329	10.094985	9.905015	15	53
8	32	9.774729	10.225271	9.869737	10.130263	10.095008	9.904992	28	52
9	15	9.774771	10.225229	9.869803	10.130197	10 095032	9.904968	45	51
10	30	9.774814	10.225186	9.869869	10.130131	10.095055	9.904945	30	50
11	45	9.774857	10.225143	9.869935	10.130065	10.095079	9.904921	15	49
12	33	9.774899	10.225101	9.870001	10.129999	10.095102	9.904898	27	48
13	15	9.774942	10.225058	9.870067	10.129933	10.095125	9.904875	45	47
14	30	9.774984	10.225016	9.870133	10.129867	10.095149	9.904851	30	46
15	45	9.775027	10.224973	9.870199	10.129801	10.095172	9.904828	15	45
16	34	9.775070	10.224930	9.870265	10.129735	10.095196	9.904804	26	44
17	15	9.775112	10.224888	9.870331	10.129669	10.095219	9.904781	45	43
18	30	9.775155	10.224845	9.870397	10.129603	10.095243	9.904757	30	42
19	45	9.775197	10.224803	9.870463	10.129537	10.095266	9.904734	15	41
20	35	9.775240	10.224760	9.870529	10.129471	10.095289	9.904711	25	40
21	15	9.775282	10.224718	9.870595	10.129405	10.095313	9.904687	45	39
22	30	9.775325	10.224675	9.870661	10.129339	10.095336	9.904664	30	38
23	45	9.775368	10.224632	9.870727	10.129273	10.095360	9.904640	15	37
24	36	9.775410	10.224590	9.870793	10.129207	10.095383	9.904617	24	36
25	15	9.775453	10.224547	9.870859	10.129141	10.095407	9.904593	45	35
26	30	9.775495	10.224505	9.870925	10.129075	10.095430	9.904570	30	34
27	45	9.775538	10.224462	9.870991	10.129009	10.095454	9.904546	15	33
28	37	9.775580	10.224420	9.871057	10.128943	10.095477	9.904523	23	32
29	15	9.775623	10.224377	9.871123	10.128877	10.095501	9.904499	45	31
30	30	9.775665	10.224335	9.871189	10.128811	10.095524	9.904476	30	30
31	45	9.775708	10.224292	9.871255	10.128745	10.095548	9.904452	15	29
32	38	9.775750	10.224250	9.871321	10.128679	10.095571	9.904429	22	28
33	15	9.775793	10.224207	9.871387	10.128613	10.095594	9.904406	45	27
34	30	9.775835	10.224165	9.871453	10.128547	10.095618	9.904382	30	26
35	45	9.775877	10.224123	9.871519	10.128481	10.095641	9.904359	15	25
36	39	9 775920	10.224080	9.871585	10.128415	10.095665	9.904335	21	24
37	15	9.775962	10.224038	9.871651	10.128349	10.095688	9.904312	45	23
38	30	9.776005	10.223995	9.871717	10.128283	10.095712	9.904288	30	22
39	45	9.776047	10.223953	9.871783	10.128217	10.095735	9.904265	15	21
40	40	9.776090	10.223910	9.871849	10.128151	10.095759	9.904241	20	20
41	15	9.776132	10.223868	9.871914	10.128086	10.095782	9.904218	45	19
42	30	9.776174	10.223826	9.871980	10.128020	10.095806	9.904194	30	18
43	45	9.776217	10.223783	9.872046	10.127954	10.095830	9.904170	15	17
44	41	9.776259	10.223741	9.872112	10.127888	10.095853	9.904147	19	16
45	15	9.776302	10.223698	9.872178	10.127822	10.095877	9.904123	45	15
46	30	9.776344	10.223656	9.872244	10.127756	10.095900	9.904100	30	14
47	45	9.776386	10.223614	9.872310	10.127690	10.095924	9.904076	15	13
48	42	9.776429	10.223571	9.872376	10.127624	10.095947	9.904053	18	12
49	15	9.776471	10.223529	9.872442	10.127558	10.095971	9.904029	45	11
50	30	9.776514	10.223486	9.872508	10.127492	10.095994	9.904006	30	10
51	45	9.776556	10.223444	9.872574	10.127426	10.096018	9.903982	15	9
52	43	9.776598	10.223402	9.872640	10.127360	10.096041	9.903959	17	8
53	15	9.776641	10.223359	9.872705	10.127295	10.096065	9.903935	45	7
54	30	9.776683	10.223317	9.872771	10.127229	10.096089	9.903911	30	6
55	45	9.776725	10.223275	9.872837	10.127163	10.096112	9.903888	15	5
56	44	9.776768	10.223232	9.872903	10.127097	10.096136	9.903864	16	4
57	15	9.776810	10.223190	9.872969	10.127031	10.096159	9.903841	45	3
58	30	9.776852	10.223148	9.873035	10.126965	10.096183	9.903817	30	2
59	45	9.776895	10.223105	9.873101	10.126899	10.096206	9.903794	15	1
60	45	9.776937	10.223063	9.873167	10.126833	10.096230	9.903770	15	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
$3^h\ 33^m$.			LOG. SINES, &c.				53 deg.		

2h 27m.			LOG. SINES, &c.				36 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	45	9.776937	10.223063	9.873167	10.126833	10.096230	9.903770	15	60
1	15	9.776979	10.223021	9.873233	10.126767	10.096254	9.903746	45	59
2	30	9.777021	10.222979	9.873298	10.126702	10.096277	9.903723	30	58
3	45	9.777064	10.222936	9.873364	10.126636	10.096301	9.903699	15	57
4	46	9.777106	10.222894	9.873430	10.126570	10.096324	9.903676	14	56
5	15	9.777148	10.222852	9.873496	10.126504	10.096348	9.903652	45	55
6	30	9.777190	10.222810	9.873562	10.126438	10.096372	9.903628	30	54
7	45	9.777233	10.222767	9.873628	10.126372	10.096395	9.903605	15	53
8	47	9.777275	10.222725	9.873694	10.126306	10.096419	9.903581	13	52
9	15	9.777317	10.222683	9.873759	10.126241	10.096442	9.903558	45	51
10	30	9.777359	10.222641	9.873825	10.126175	10.096466	9.903534	30	50
11	45	9.777402	10.222598	9.873891	10.126109	10.096490	9.903510	15	49
12	48	9.777444	10.222556	9.873957	10.126043	10.096513	9.903487	12	48
13	15	9.777486	10.222514	9.874023	10.125977	10.096537	9.903463	45	47
14	30	9.777528	10.222472	9.874089	10.125911	10.096560	9.903440	30	46
15	45	9.777571	10.222429	9.874155	10.125845	10.096584	9.903416	15	45
16	49	9.777613	10.222387	9.874220	10.125780	10.096608	9.903392	11	44
17	15	9.777655	10.222345	9.874286	10 125714	10.096631	9.903369	45	43
18	30	9.777697	10.222303	9.874352	10.125648	10.096655	9.903345	30	42
19	45	9.777739	10.222261	9 874418	10.125582	10.096679	9.903321	15	41
20	50	9.777781	10.222219	9.874484	10.125516	10.096702	9.903298	10	40
21	15	9.777824	10.222176	9.874550	10.125450	10.096726	9.903274	45	39
22	30	9.777866	10.222134	9.874615	10.125385	10.096750	9.903250	30	38
23	45	9.777908	10.222092	9.874681	10.125319	10.096773	9.903227	15	37
24	51	9.777950	10.222050	9.874747	10.125253	10.096797	9.903203	9	36
25	15	9.777992	10.222008	9.874813	10.125187	10.096821	9.903179	45	35
26	30	9.778034	10.221966	9.874879	10.125121	10.096844	9.903156	30	34
27	45	9.778076	10.221924	9.874944	10.125056	10.096868	9.903132	15	33
28	52	9.778119	10.221881	9.875010	10.124990	10.096892	9.903108	8	32
29	15	9.778161	10.221839	9 875076	10 124924	10.096915	9.903085	45	31
30	30	9.778203	10.221797	9.875142	10.124858	10.096939	9.903061	30	30
31	45	9.778245	10.221755	9 875208	10.124792	10.096963	9.903037	15	29
32	53	9.778287	10.221713	9.875273	10.124727	10.096986	9.903014	7	28
33	15	9.778329	10.221671	9.875339	10.124661	10.097010	9.902990	45	27
34	30	9.778371	10.221629	9 875405	10.124595	10.097034	9.902966	30	26
35	45	9.778413	10.221587	9.875471	10.124529	10.097058	9.902942	15	25
36	54	9.778455	10.221545	9.875536	10.124464	10.097081	9.902919	6	24
37	15	9.778497	10.221503	9.875602	10.124398	10.097105	9.902895	45	23
38	30	9.778539	10.221461	9.875668	10.124332	10.097129	9.902871	30	22
39	45	9.778581	10.221419	9.875734	10.124266	10.097152	9 902848	15	21
40	55	9.778623	10.221377	9.875800	10.124200	10.097176	9.902824	5	20
41	15	9.778666	10.221334	9.875865	10.124135	10.097200	9.902800	45	19
42	30	9.778708	10.221292	9.875931	10.124069	10.097224	9.902776	30	18
43	45	9.778750	10.221250	9.875997	10.124003	10.097247	9.902753	15	17
44	56	9.778792	10.221208	9.876063	10.123937	10.097271	9.902729	4	16
45	15	9.778834	10.221166	9.876128	10.123872	10.097295	9.902705	45	15
46	30	9.778876	10.221124	9.876194	10.123806	10.097319	9.902681	30	14
47	45	9.778918	10.221082	9.876260	10.123740	10.097342	9.902658	15	13
48	57	9.778960	10.221040	9.876326	10.123674	10.097366	9.902634	3	12
49	15	9.779002	10.220998	9.876391	10.123609	10.097390	9.902610	45	11
50	30	9.779044	10.220956	9.876457	10.123543	10.097414	9.902586	30	10
51	45	9.779086	10.220914	9.876523	10.123477	10.097437	9.902563	15	9
52	58	9.779127	10.220873	9.876589	10.123411	10.097461	9.902539	2	8
53	15	9.779169	10.220831	9.876654	10.123346	10.097485	9.902515	45	7
54	30	9.779211	10.220789	9.876720	10.123280	10.097509	9.902491	30	6
55	45	9.779253	10.220747	9.876786	10.123214	10.097532	9.902468	15	5
56	59	9.779295	10.220705	9.876851	10.123149	10.097556	9.902444	1	4
57	15	9.779337	10.220663	9.876917	10.123083	10.097580	9.902420	45	3
58	30	9.779379	10.220621	9.876983	10.123017	10.097604	9.902396	30	2
59	45	9.779421	10 220579	9.877049	10.122951	10.097628	9.902372	15	1
60	60	9.779463	10.220537	9.877114	10.122886	10.097651	9.902349	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
3h 32m.			LOG. SINES, &c.				53 deg.		

	2h 28m.			LOG. SINES, &c.			37 deg.		
″	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	0	9.779463	10.220537	9.877114	10.122886	10.097651	9.902349	60	60
1	15	9.779505	10.220495	9.877180	10.122820	10.097675	9.902325	45	59
2	30	9.779547	10.220453	9.877246	10.122754	10.097699	9.902301	30	58
3	45	9.779589	10.220411	9.877311	10.122689	10.097723	9.902277	15	57
4	1	9.779631	10.220369	9.877377	10.122623	10.097747	9.902253	59	56
5	15	9.779672	10.220328	9.877443	10.122557	10.097770	9.902230	45	55
6	30	9.779714	10.220286	9.877509	10.122491	10.097794	9.902206	30	54
7	45	9.779756	10.220244	9.877574	10.122426	10.097818	9.902182	15	53
8	2	9.779798	10.220202	9.877640	10.122360	10.097842	9.902158	58	52
9	15	9.779840	10.220160	9.877706	10.122294	10.097866	9.902134	45	51
10	30	9.779882	10.220118	9.877771	10.122229	10.097890	9.902110	30	50
11	45	9.779924	10.220076	9.877837	10.122163	10.097913	9.902087	15	49
12	3	9.779965	10.220035	9.877903	10.122097	10.097937	9.902063	57	48
13	15	9.780007	10.219993	9.877968	10.122032	10.097961	9.902039	45	47
14	30	9.780049	10.219951	9.878034	10.121966	10.097985	9.902015	30	46
15	45	9.780091	10.219909	9.878100	10.121900	10.098009	9.901991	15	45
16	4	9.780133	10.219867	9.878165	10.121835	10.098033	9.901967	56	44
17	15	9.780175	10.219825	9.878231	10.121769	10.098057	9.901943	45	43
18	30	9.780216	10.219784	9.878297	10.121703	10.098080	9.901920	30	42
19	45	9.780258	10.219742	9.878362	10.121638	10.098104	9.901896	15	41
20	5	9.780300	10.219700	9.878428	10.121572	10.098128	9.901872	55	40
21	15	9.780342	10.219658	9.878494	10.121506	10.098152	9.901848	45	39
22	30	9.780384	10.219616	9.878559	10.121441	10.098176	9.901824	30	38
23	45	9.780425	10.219575	9.878625	10.121375	10.098200	9.901800	15	37
24	6	9.780467	10.219533	9.878691	10.121309	10.098224	9.901776	54	36
25	15	9.780509	10.219491	9.878756	10.121244	10.098248	9.901752	45	35
26	30	9.780551	10.219449	9.878822	10.121178	10.098271	9.901729	30	34
27	45	9.780592	10.219408	9.878888	10.121112	10.098295	9.901705	15	33
28	7	9.780634	10.219366	9.878953	10.121047	10.098319	9.901681	53	32
29	15	9.780676	10.219324	9.879019	10.120981	10.098343	9.901657	45	31
30	30	9.780717	10.219283	9.879084	10.120916	10.098367	9.901633	30	30
31	45	9.780759	10 219241	9.879150	10.120850	10.098391	9.901609	15	29
32	8	9.780801	10.219199	9.879216	10.120784	10.098415	9.901585	52	28
33	15	9.780843	10.219157	9.879281	10.120719	10.098439	9.901561	45	27
34	30	9.780884	10.219116	9.879347	10.120653	10.098463	9.901537	30	26
35	45	9.780926	10.219074	9.879413	10.120587	10.098487	9.901513	15	25
36	9	9.780968	10.219032	9.879478	10.120522	10.098511	9.901489	51	24
37	15	9.781009	10.218991	9.879544	10.120456	10.098534	9.901466	45	23
38	30	9.781051	10.218949	9.879609	10.120391	10.098558	9.901442	30	22
39	45	9.781093	10.218907	9.879675	10.120325	10.098582	9.901418	15	21
40	10	9.781134	10.218866	9.879741	10.120259	10.098606	9.901394	50	20
41	15	9.781176	10.218824	9.879806	10.120194	10.098630	9.901370	45	19
42	30	9.781218	10.218782	9.879872	10.120128	10.098654	9.901346	30	18
43	45	9.781259	10.218741	9.879937	10.120063	10.098678	9.901322	15	17
44	11	9.781301	10.218699	9.880003	10.119997	10.098702	9.901298	49	16
45	15	9.781343	10.218657	9.880069	10.119931	10.098726	9.901274	45	15
46	30	9.781384	10.218616	9.880134	10.119866	10.098750	9.901250	30	14
47	45	9.781426	10.218574	9.880200	10.119800	10.098774	9.901226	15	13
48	12	9.781467	10.218533	9.880265	10.119735	10.098798	9.901202	48	12
49	15	9.781509	10.218491	9.880331	10.119669	10.098822	9.901178	45	11
50	30	9.781551	10.218449	9.880397	10.119603	10.098846	9.901154	30	10
51	45	9.781592	10.218408	9.880462	10.119538	10.098870	9.901130	15	9
52	13	9.781634	10.218366	9.880528	10.119472	10.098894	9.901106	47	8
53	15	9.781675	10.218325	9.880593	10.119407	10.098918	9.901082	45	7
54	30	9.781717	10.218283	9.880659	10.119341	10.098942	9.901058	30	6
55	45	9.781759	10.218241	9.880724	10.119276	10.098966	9.901034	15	5
56	14	9.781800	10.218200	9.880790	10.119210	10.098990	9.901010	46	4
57	15	9.781842	10.218158	9.880855	10.119145	10.099014	9.900986	45	3
58	30	9.781883	10.218117	9.880921	10.119079	10.099038	9.900962	30	2
59	45	9.781925	10.218075	9.880987	10.119013	10.099062	9.900938	15	1
60	15	9.781966	10.218034	9.881052	10.118948	10.099086	9.900914	45	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	3h 31m.			LOG. SINES, &c.			52 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	2h 29m.		LOG. SINES, &c.				37 deg.		
0	15	9.781966	10.218034	9.881052	10.118948	10.099086	9.900914	45	60
1	15	9.782008	10.217992	9.881118	10.118882	10.099110	9.900890	45	59
2	30	9.782049	10.217951	9.881183	10.118817	10.099134	9.900866	30	58
3	45	9.782091	10.217909	9.881249	10.118751	10.099158	9.900842	15	57
4	16	9.782132	10.217868	9.881314	10.118686	10.099182	9.900818	44	56
5	15	9.782174	10.217826	9.881380	10.118620	10.099206	9.900794	45	55
6	30	9.782215	10.217785	9.881445	10.118555	10.099230	9.900770	30	54
7	45	9.782257	10.217743	9.881511	10.118489	10.099254	9.900746	15	53
8	17	9.782298	10.217702	9.881576	10.118424	10.099278	9.900722	43	52
9	15	9.782340	10.217660	9.881642	10.118358	10.099302	9.900698	45	51
10	30	9.782381	10.217619	9.881708	10.118292	10.099326	9.900674	30	50
11	45	9.782423	10.217577	9.881773	10.118227	10.099350	9.900650	15	49
12	18	9.782464	10.217536	9.881839	10.118161	10.099374	9.900626	42	48
13	15	9.782506	10.217494	9.881904	10.118096	10.099398	9.900602	45	47
14	30	9.782547	10.217453	9 881970	10.118030	10.099422	9.900578	30	46
15	45	9.782589	10.217411	9.882035	10.117965	10.099447	9.900553	15	45
16	19	9.782630	10.217370	9.882101	10.117899	10.099471	9.900529	41	44
17	15	9.782671	10.217329	9.882166	10.117834	10.099495	9.900505	45	43
18	30	9.782713	10.217287	9.882232	10.117768	10.099519	9.900481	30	42
19	45	9.782754	10.217246	9.882297	10.117703	10.099543	9.900457	15	41
20	20	9.782796	10 217204	9.882363	10.117637	10.099567	9.900433	40	40
21	15	9.782837	10.217163	9.882428	10.117572	10.099591	9.900409	45	39
22	30	9.782879	10.217121	9.882494	10.117506	10.099615	9.900385	30	38
23	45	9.782920	10.217080	9.882559	10.117441	10.099639	9.900361	15	37
24	21	9.782961	10.217039	9.882625	10.117375	10.099663	9.900337	39	36
25	15	9.783003	10.216997	9.882690	10.117310	10.099687	9.900313	45	35
26	30	9.783044	10.216956	9.882756	10.117244	10.099712	9.900288	30	34
27	45	9.783085	10.216915	9.882821	10.117179	10.099736	9.900264	15	33
28	22	9.783127	10.216873	9.882887	10.117113	10.099760	9.900240	38	32
29	15	9 783168	10.216832	9.882952	10.117048	10.099784	9.900216	45	31
30	30	9.783209	10.216791	9.883017	10.116983	10.099808	9.900192	30	30
31	45	9.783251	10.216749	9.883083	10.116917	10.099832	9.900168	15	29
32	23	9.783292	10.216708	9.883148	10 116852	10.099856	9.900144	37	28
33	15	9.783334	10.216666	9.883214	10.116786	10.099880	9.900120	45	27
34	30	9.783375	10 216625	9.883279	10.116721	10.099905	9.900095	30	26
35	45	9.783416	10.216584	9.883345	10.116655	10.099929	9.900071	15	25
36	24	9.783457	10.216543	9.883410	10.116590	10.099953	9.900047	36	24
37	15	9.783499	10.216501	9.883476	10.116524	10.099977	9.900023	45	23
38	30	9.783540	10.216460	9.883541	10.116459	10.100001	9.899999	30	22
39	45	9.783581	10.216419	9.883607	10.116393	10.100025	9.899975	15	21
40	25	9.783623	10.216377	9.883672	10.116328	10.100049	9.899951	35	20
41	15	9.783664	10.216336	9.883737	10.116263	10.100074	9.899926	45	19
42	30	9.783705	10.216295	9.883803	10.116197	10.100098	9.899902	30	18
43	45	9.783746	10.216254	9.883868	10.116132	10.100122	9.899878	15	17
44	26	9.783788	10.216212	9.883934	10.116066	10.100146	9.899854	34	16
45	15	9.783829	10.216171	9.883999	10.116001	10.100170	9.899830	45	15
46	30	9.783870	10.216130	9.884065	10.115935	10.100194	9.899806	30	14
47	45	9.783911	10.216089	9.884130	10.115870	10.100219	9.899781	15	13
48	27	9 783953	10.216047	9.884196	10.115804	10 100243	9.899757	33	12
49	15	9 783994	10.216006	9.884261	10.115739	10.100267	9.899733	45	11
50	30	9.784035	10.215965	9.884326	10.115674	10.100291	9.899709	30	10
51	45	9 784076	10.215924	9.884392	10.115608	10.100315	9.899685	15	9
52	28	9.784118	10.215882	9.884457	10.115543	10.100340	9.899660	32	8
53	15	9.784159	10.215841	9.884523	10.115477	10.100364	9.899636	45	7
54	30	9.784200	10.215800	9.884588	10.115412	10.100388	9.899612	30	6
55	45	9.784241	10.215759	9.884653	10.115347	10.100412	9.899588	15	5
56	29	9.784282	10.215718	9.884719	10.115281	10.100436	9.899564	31	4
57	15	9.784324	10.215676	9.884784	10 115216	10 100461	9.899539	45	3
58	30	9.784365	10.215635	9.884850	10.115150	10.100485	9.899515	30	2
59	45	9.784406	10.215594	9.884915	10.115085	10.100509	9.899491	15	1
60	30	9.784447	10.215553	9.884930	10.115020	10.100533	9.899467	30	0
sec.	′ ″	cosine.	secant.	cotangent	tangent.	cosecant.	sine.	″ ′	sec.
	3h 30m.		LOG. SINES &c.				52 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	$2^h\ 30^m$.		LOG. SINES, &c.				37 deg.		
0	30	9.784447	10.215553	9.884980	10.115020	10.100533	9.899467	30	60
1	15	9.784488	10.215512	9.885046	10.114954	10.100558	9.899442	45	59
2	30	9.784529	10.215471	9.885111	10.114889	10.100582	9.899418	30	58
3	45	9.784571	10.215429	9.885177	10.114823	10.100606	9.899394	15	57
4	31	9.784612	10.215388	9.885242	10.114758	10.100630	9.899370	29	56
5	15	9.784653	10.215347	9.885307	10.114693	10.100655	9.899345	45	55
6	30	9.784694	10.215306	9.885373	10.114627	10.100679	9.899321	30	54
7	45	9.784735	10.215265	9.885438	10.114562	10.100703	9.899297	15	53
8	32	9.784776	10.215224	9.885503	10.114497	10.100727	9.899273	28	52
9	15	9.784817	10.215183	9.885569	10.114431	10.100752	9.899248	45	51
10	30	9.784858	10.215142	9.885634	10.114366	10.100776	9.899224	30	50
11	45	9.784899	10.215101	9.885700	10.114300	10.100800	9.899200	15	49
12	33	9.784941	10.215059	9.885765	10.114235	10.100824	9.899176	27	48
13	15	9.784982	10.215018	9.885830	10.114170	10.100849	9.899151	45	47
14	30	9.785023	10.214977	9.885896	10.114104	10.100873	9.899127	30	46
15	45	9.785064	10.214936	9.885961	10.114039	10.100897	9.899103	15	45
16	34	9.785105	10.214895	9.886026	10.113974	10.100922	9.899078	26	44
17	15	9 785146	10.214854	9.886092	10.113908	10.100946	9.899054	45	43
18	30	9.785187	10.214813	9.886157	10.113843	10.100970	9.899030	30	42
19	45	9.785228	10.214772	9.886222	10.113778	10.100995	9.899005	15	41
20	35	9.785269	10.214731	9.886288	10.113712	10.101019	9.898981	25	40
21	15	9.785310	10.214690	9.886353	10.113647	10.101043	9.898957	45	39
22	30	9.785351	10.214649	9.886418	10.113582	10.101067	9.898933	30	38
23	45	9.785392	10.214608	9.886484	10.113516	10.101092	9.898908	15	37
24	36	9.785433	10.214567	9.886549	10.113451	10.101116	9.898884	24	36
25	15	9.785474	10.214526	9 686614	10.113386	10.101140	9.898860	45	35
26	30	9.785515	10.214485	9.286680	10.113320	10.101165	9.898835	30	34
27	45	9.785556	10.214444	9.886745	10.113255	10.101189	9.898811	15	33
28	37	9.785597	10.214403	9.886810	10.113190	10.101213	9.898787	23	32
29	15	9.785638	10.214362	9.886876	10.113124	10.101238	9.898762	45	31
30	30	9.785679	10.214321	9.886941	10.113059	10.101262	9.898738	30	30
31	45	9.785720	10.214280	9.887006	10.112994	10.101286	9.898714	15	29
32	38	9.785761	10.214239	9.887072	10.112928	10.101311	9.898689	22	28
33	15	9.785802	10.214198	9.887137	10.112863	10.101335	9.898665	45	27
34	30	9.785843	10.214157	9.887202	10.112798	10.101359	9.898641	30	26
35	45	9.785884	10.214116	9.887268	10.112732	10.101384	9.898616	15	25
36	39	9.785925	10.214075	9.887333	10.112667	10.101408	9.898592	21	24
37	15	9.785966	10.214034	9.887398	10.112602	10.101433	9.898567	45	23
38	30	9.786007	10.213993	9.887464	10.112536	10.101457	9.898543	30	22
39	45	9.786048	10.213952	9.887529	10.112471	10.101481	9.898519	15	21
40	40	9.786089	10.213911	9.887594	10.112406	10.101506	9.898494	20	20
41	15	9.786129	10.213871	9.887659	10.112341	10.101530	9.898470	45	19
42	30	9.786170	10.213830	9.887725	10.112275	10.101554	9.898446	30	18
43	45	9.786211	10.213789	9.887790	10.112210	10.101579	9.898421	15	17
44	41	9.786252	10.213748	9.887855	10.112145	10.101603	9.898397	19	16
45	15	9.786293	10.213707	9.887921	10.112079	10.101628	9.898372	45	15
46	30	9.786334	10.213666	9.887986	10.112014	10.101652	9.898348	30	14
47	45	9.786375	10.213625	9.888051	10.111949	10.101676	9.898324	15	13
48	42	9.786416	10.213584	9.888116	10.111884	10.101701	9.898299	18	12
49	15	9.786456	10.213544	9.888182	10.111818	10.101725	9.898275	45	11
50	30	9.786497	10.213503	9.888247	10.111753	10.101750	9.898250	30	10
51	45	9.786538	10.213462	9.888312	10.111688	10.101774	9.898226	15	9
52	43	9.786579	10.213421	9.888377	10.111623	10.101799	9.898201	17	8
53	15	9.786620	10.213380	9.888443	10.111557	10.101823	9.898177	45	7
54	30	9.786661	10.213339	9.888508	10.111492	10.101847	9.898153	30	6
55	45	9.786702	10.213298	9.888573	10.111427	10.101872	9.898128	15	5
56	44	9.786742	10.213258	9.888639	10.111361	10.101896	9.898104	16	4
57	15	9.786783	10.213217	9.888704	10.111296	10.101921	9.898079	45	3
58	30	9.786824	10.213176	9.888769	10.111231	10.101945	9.898055	30	2
59	45	9.786865	10.213135	9.888834	10.111166	10.101970	9.898030	15	1
60	45	9.786906	10.213094	9.888900	10.111100	10.101994	9.898006	15	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$3^h\ 29^m$		LOG. SINES, &c.				52 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	2h 31m.		LOG. SINES, &c.				37 deg.		
0	45	9 786906	10.213094	9.888900	10.111100	10.101994	9.898006	15	60
1	15	9.786946	10.213054	9.888965	10.111035	10.102018	9.897982	45	59
2	30	9.786987	10.213013	9 889030	10.110970	10.102043	9.897957	30	58
3	45	9.787028	10.212972	9.889095	10.110905	10.102067	9.897933	15	57
4	46	9.787069	10.212931	9.889160	10.110840	10.102092	9 897908	14	56
5	15	9.787109	10.212891	9.889226	10.110774	10.102116	9.897884	45	55
6	30	9.787150	10.212850	9.889291	10.110709	10.102141	9.897859	30	54
7	45	9.787191	10.212809	9.889356	10.110644	10.102165	9.897835	15	53
8	47	9.787232	10.212768	9 889421	10.110579	10.102190	9.897810	13	52
9	15	9.787272	10.212728	9.889487	10.110513	10.102214	9.897786	45	51
10	30	9.787313	10.212687	9.889552	10.110448	10.102239	9.897761	30	50
11	45	9.787354	10.212646	9.889617	10.110383	10.102263	9.897737	15	49
12	48	9.787395	10.212605	9.889682	10.110318	10.102288	9.897712	12	48
13	15	9.787435	10.212565	9.889747	10.110253	10.102312	9.897688	45	47
14	30	9.787476	10.212524	9.889813	10.110187	10.102337	9.897663	30	46
15	45	9.787517	10.212483	9.889878	10.110122	10.102361	9.897639	15	45
16	49	9.787557	10.212443	9.889943	10.110057	10.102386	9.897614	11	44
17	15	9.787598	10.212402	9.890008	10.109992	10.102410	9.897590	45	43
18	30	9.787639	10.212361	9.890074	10.109926	10.102435	9.897565	30	42
19	45	9.787679	10.212321	9.890139	10.109861	10.102459	9.897541	15	41
20	50	9.787720	10.212280	9.890204	10.109796	10.102484	9.897516	10	40
21	15	9.787761	10.212239	9.890269	10.109731	10.102509	9.897492	45	39
22	30	9.787801	10.212199	9.890334	10.109666	10.102533	9.897467	30	38
23	45	9.787842	10.212158	9.890399	10.109601	10.102557	9.897443	15	37
24	51	9.787883	10.212117	9.890465	10.109535	10.102582	9.897418	9	36
25	15	9.787923	10.212077	9.890530	10.109470	10.102607	9.897393	45	35
26	30	9.787964	10.212036	9.890595	10.109405	10.102631	9.897369	30	34
27	45	9.788005	10.211995	9.890660	10.109340	10.102656	9.897344	15	33
28	52	9.788045	10.211955	9.890725	10.109275	10.102680	9.897320	8	32
29	15	9.788086	10.211914	9.890791	10.109209	10.102705	9.897295	45	31
30	30	9.788126	10.211874	9.890856	10.109144	10.102729	9.897271	30	30
31	45	9.788167	10.211833	9.890921	10.109079	10.102754	9.897246	15	29
32	53	9.788208	10.211792	9.890986	10.109014	10.102778	9.897222	7	28
33	15	9.788248	10.211752	9.891051	10.108949	10.102803	9.897197	45	27
34	30	9.788289	10.211711	9.891116	10.108884	10.102828	9.897172	30	26
35	45	9.788329	10.211671	9.891182	10.108818	10.102852	9.897148	15	25
36	54	9.788370	10.211630	9.891247	10.108753	10.102877	9.897123	6	24
37	15	9.788411	10.211589	9.891312	10.108688	10.102901	9.897099	45	23
38	30	9.788451	10.211549	9.891377	10.108623	10.102926	9.897074	30	22
39	45	9.788492	10.211508	9.891442	10.108558	10.102951	9.897049	15	21
40	55	9.788532	10.211468	9.891507	10.108493	10.102975	9.897025	5	20
41	15	9.788573	10.211427	9.891572	10.108428	10.103000	9.897000	45	19
42	30	9.788613	10.211387	9.891638	10.108362	10.103024	9.896976	30	18
43	45	9.788654	10.211346	9.891703	10.108297	10.103049	9.896951	15	17
44	56	9.788694	10.211306	9.891768	10.108232	10.103074	9.896926	4	16
45	15	9.788735	10.211265	9.891833	10.108167	10.103098	9.896902	45	15
46	30	9.788775	10.211225	9.891898	10.108102	10.103123	9.896877	30	14
47	45	9.788816	10.211184	9.891963	10.108037	10.103147	9.896853	15	13
48	57	9.788856	10.211144	9.892028	10.107972	10.103172	9.896828	3	12
49	15	9.788897	10.211103	9.892094	10.107906	10.103197	9.896803	45	11
50	30	9.788937	10.211063	9.892159	10.107841	10.103221	9.896779	30	10
51	45	9.788978	10.211022	9.892224	10.107776	10.103246	9.896754	15	9
52	58	9.789018	10.210982	9.892289	10.107711	10.103271	9.896729	2	8
53	15	9.789059	10.210941	9.892354	10.107646	10.103295	9.896705	45	7
54	30	9.789099	10.210901	9.892419	10.107581	10.103320	9.896680	30	6
55	45	9.789140	10.210860	9.892484	10.107516	10.103345	9.896655	15	5
56	59	9.789180	10.210820	9.892549	10.107451	10.103369	9.896631	1	4
57	15	9.789221	10.210779	9.892614	10.107386	10.103394	9.896606	45	3
58	30	9.789261	10.210739	9.892680	10.107320	10.103419	9.896581	30	2
59	45	9.789302	10.210698	9.892745	10.107255	10.103443	9.896557	15	1
60	60	9.789342	10.210658	9.892810	10.107190	10.103468	9.896532	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	3h 28m.		LOG. SINES, &c.				52 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	$2^h\ 32^m$,		LOG. SINES, &c.				38 deg.		
0	0	9.789342	10.210658	9.892810	10.107190	10.103468	9.896532	60	60
1	15	9.789382	10.210618	9.892875	10.107125	10.103493	9.896507	45	59
2	30	9.789423	10.210577	9.892940	10.107060	10.103517	9.896483	30	58
3	45	9.789463	10.210537	9.893005	10.106995	10.103542	9.896458	15	57
4	1	9.789504	10.210496	9.893070	10.106930	10.103567	9.896433	59	56
5	15	9.789544	10.210456	9.893135	10.106865	10.103591	9.896409	45	55
6	30	9.789584	10.210416	9.893200	10.106800	10.103616	9.896384	30	54
7	45	9 789625	10.210375	9.893265	10.106735	10.103641	9.896359	15	53
8	2	9.789665	10.210335	9.893331	10.106669	10.103665	9.896335	58	52
9	15	9.789706	10.210294	9.893396	10.106604	10.103690	9.896310	45	51
10	30	9.789746	10.210254	9.893461	10.106539	10.103715	9.896285	30	50
11	45	9.789786	10.210214	9.893526	10.106474	10.103740	9.896260	15	49
12	3	9.789827	10.210173	9.893591	10.106409	10.103764	9.896236	57	48
13	15	9.789867	10.210133	9.893656	10.106344	10.103789	9.896211	45	47
14	30	9.789907	10.210093	9.893721	10.106279	10.103814	9.896186	30	46
15	45	9.789948	10.210052	9.893786	10.106214	10.103838	9.896162	15	45
16	4	9.789988	10.210012	9.893851	10.106149	10.103863	9.896137	56	44
17	15	9.790028	10.209972	9.893916	10.106084	10.103888	9.896112	45	43
18	30	9.790069	10.209931	9.893981	10.106019	10.103913	9.896087	30	42
19	45	9.790109	10.209891	9.894046	10.105954	10.103937	9.896063	15	41
20	5	9.790149	10.209851	9.894111	10.105889	10.103962	9.896038	55	40
21	15	9.790190	10.209810	9.894176	10.105824	10.103987	9.896013	45	39
22	30	9.790230	10.209770	9.894241	10.105759	10.104012	9.895988	30	38
23	45	9.790270	10.209730	9.894306	10.105694	10.104036	9.895964	15	37
24	6	9.790310	10.209690	9.894371	10.105629	10.104061	9.895939	54	36
25	15	9.790351	10.209649	9.894437	10.105563	10.104086	9.895914	45	35
26	30	9.790391	10.209609	9.894502	10.105498	10.104111	9.895889	30	34
27	45	9.790431	10.209569	9.894567	10.105433	10.104135	9.895865	15	33
28	7	9.790471	10.209529	9.894632	10.105368	10.104160	9.895840	53	32
29	15	9.790512	10.209488	9.894697	10.105303	10.104185	9.895815	45	31
30	30	9.790552	10.209448	9.894762	10.105238	10.104210	9.895790	30	30
31	45	9.790592	10.209408	9.894827	10.105173	10.104235	9.895765	15	29
32	8	9.790632	10.209368	9.894892	10.105108	10.104259	9.895741	52	28
33	15	9.790673	10.209327	9.894957	10.105043	10.104284	9.895716	45	27
34	30	9.790713	10.209287	9.895022	10.104978	10.104309	9.895691	30	26
35	45	9.790753	10.209247	9.895087	10.104913	10.104334	9.895666	15	25
36	9	9.790793	10.209207	9.895152	10.104848	10.104359	9.895641	51	24
37	15	9.790833	10.209167	9.895217	10.104783	10.104383	9.895617	45	23
38	30	9.790874	10.209126	9.895282	10.104718	10.104408	9.895592	30	22
39	45	9.790914	10.209086	9.895347	10.104653	10.104433	9.895567	15	21
40	10	9.790954	10.209046	9.895412	10.104588	10.104458	9.895542	50	20
41	15	9.790994	10.209006	9.895477	10.104523	10.104483	9.895517	45	19
42	30	9.791034	10.208966	9.895542	10.104458	10.104508	9.895492	30	18
43	45	9.791075	10.208925	9.895607	10.104393	10.104532	9.895468	15	17
44	11	9.791115	10.208885	9.895672	10.104328	10.104557	9.895443	49	16
45	15	9.791155	10.208845	9.895737	10.104263	10.104582	9.895418	45	15
46	30	9.791195	10.208805	9.895802	10.104198	10.104607	9.895393	30	14
47	45	9.791235	10.208765	9.895867	10.104133	10.104632	9.895368	15	13
48	12	9.791275	10.208725	9.895932	10.104068	10.104657	9.895343	48	12
49	15	9.791315	10.208685	9.895997	10.104003	10.104681	9.895319	45	11
50	30	9.791356	10.208644	9.896062	10.103938	10.104706	9.895294	30	10
51	45	9.791396	10.208604	9.896127	10.103873	10.104731	9.895269	15	9
52	13	9.791436	10.208564	9.896192	10.103808	10.104756	9.895244	47	8
53	15	9.791476	10.208524	9.896257	10.103743	10.104781	9.895219	45	7
54	30	9.791516	10.208484	9.896322	10.103678	10.104806	9.895194	30	6
55	45	9.791556	10.208444	9.896387	10.103613	10.104831	9.895169	15	5
56	14	9.791596	10.208404	9.896452	10.103548	10.104856	9.895144	46	4
57	15	9.791636	10.208364	9.896517	10.103483	10.104880	9.895120	45	3
58	30	9.791676	10.208324	9.896582	10.103418	10.104905	9.895095	30	2
59	45	9.791716	10.208284	9.896647	10.103353	10.104930	9.895070	15	1
60	15	9.791757	10.208243	9.896712	10.103288	10.104955	9.895045	45	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$8^h\ 27^m$.		LOG. SINES, &c.				51 deg.		

2h 33m.				LOG. SINES, &c.				38 deg.	
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	15	9.791757	10.208243	9.896712	10.103288	10.104955	9.895045	45	60
1	15	9.791797	10.208203	9.896777	10.103223	10.104980	9.895020	45	59
2	30	9.791837	10.208163	9.896841	10.103159	10.105005	9.894995	30	58
3	45	9.791877	10.208123	9.896906	10.103094	10.105030	9.894970	15	57
4	16	9.791917	10.208083	9.896971	10.103029	10.105055	9.894945	44	56
5	15	9.791957	10.208043	9.897036	10.102964	10.105080	9.894920	45	55
6	30	9.791997	10.208003	9.897101	10.102899	10.105105	9.894895	30	54
7	45	9.792037	10.207963	9.897166	10.102834	10.105129	9.894871	15	53
8	17	9.792077	10.207923	9.897231	10.102769	10.105154	9.894846	43	52
9	15	9.792117	10.207883	9.897296	10.102704	10.105179	9.894821	45	51
10	30	9.792157	10.207843	9.897361	10.102639	10.105204	9.894796	30	50
11	45	9.792197	10.207803	9.897426	10.102574	10.105229	9.894771	15	49
12	18	9.792237	10.207763	9.897491	10.102509	10.105254	9.894746	42	48
13	15	9.792277	10.207723	9.897556	10.102444	10.105279	9.894721	45	47
14	30	9.792317	10.207683	9.897621	10.102379	10.105304	9.894696	30	46
15	45	9.792357	10.207643	9.897686	10.102314	10.105329	9.894671	15	45
16	19	9.792397	10.207603	9.897751	10.102249	10.105354	9.894646	41	44
17	15	9.792437	10.207563	9.897816	10.102184	10.105379	9.894621	45	43
18	30	9.792477	10.207523	9.897880	10.102120	10.105404	9.894596	30	42
19	45	9.792517	10.207483	9.897945	10.102055	10.105429	9.894571	15	41
20	20	9.792557	10.207443	9.898010	10.101990	10.105454	9.894546	40	40
21	15	9.792597	10.207403	9.898075	10.101925	10.105479	9.894521	45	39
22	30	9.792636	10.207364	9.898140	10.101860	10.105504	9.894496	30	38
23	45	9.792676	10.207324	9.898205	10.101795	10.105529	9.894471	15	37
24	21	9.792716	10.207284	9.898270	10.101730	10.105554	9.894446	39	36
25	15	9.792756	10.207244	9.898335	10.101665	10.105579	9.894421	45	35
26	30	9.792796	10.207204	9.898400	10.101600	10.105604	9.894396	30	34
27	45	9.792836	10.207164	9.898465	10.101535	10.105629	9.894371	15	33
28	22	9.792876	10 207124	9.898530	10.101470	10.105654	9.894346	38	32
29	15	9.792916	10.207084	9.898594	10.101406	10.105679	9.894321	45	31
30	30	9.792956	10.207044	9.898659	10.101341	10.105704	9.894296	30	30
31	45	9.792996	10.207004	9.898724	10.101276	10.105729	9.894271	15	29
32	23	9.793035	10.206965	9.898789	10.101211	10.105754	9.894246	37	28
33	15	9.793075	10.206925	9.898854	10.101146	10.105779	9.894221	45	27
34	30	9.793115	10.206885	9.898919	10.101081	10.105804	9.894196	30	26
35	45	9.793155	10.206845	9.898984	10.101016	10.105829	9.894171	15	25
36	24	9.793195	10.206805	9.899049	10.100951	10.105854	9.894146	36	24
37	15	9.793235	10.206765	9.899114	10.100886	10.105879	9.894121	45	23
38	30	9.793275	10.206725	9.899178	10.100822	10.105904	9.894096	30	22
39	45	9 793314	10.206686	9.899243	10.100757	10.105929	9.894071	15	21
40	25	9.793354	10.206646	9.899308	10.100692	10.105954	9.894046	35	20
41	15	9.793394	10.206606	9.899373	10.100627	10.105979	9.894021	45	19
42	30	9.793434	10.206566	9.899438	10.100562	10.106004	9.893996	30	18
43	45	9.793474	10.206526	9.899503	10.100497	10.106029	9.893971	15	17
44	26	9.793513	10.206487	9.899568	10.100432	10.106054	9.893946	34	16
45	15	9.793553	10.206447	9.899632	10.100368	10.106079	9.893921	45	15
46	30	9.793593	10.206407	9.899697	10.100303	10.106104	9.893896	30	14
47	45	9.793633	10.206367	9.899762	10.100238	10.106129	9.893871	15	13
48	27	9.793673	10.206327	9.899827	10.100173	10.106154	9.893846	33	12
49	15	9.793712	10.206288	9.899892	10.100108	10.106180	9.893820	45	11
50	30	9.793752	10.206248	9.899957	10.100043	10.106205	9.893795	30	10
51	45	9.793792	10.206208	9.900022	10.099978	10.106230	9.893770	15	9
52	28	9.793832	10.206168	9.900086	10.099914	10.106255	9.893745	32	8
53	15	9.793871	10.206129	9.900151	10.099849	10.106280	9.893720	45	7
54	30	9.793911	10.206089	9.900216	10.099784	10.106305	9.893695	30	6
55	45	9.793951	10.206049	9.900281	10.099719	10.106330	9.893670	15	5
56	29	9.793991	10.206009	9.900346	10.099654	10.106355	9.893645	31	4
57	15	9.794030	10.205970	9.900411	10.099589	10.106380	9.893620	45	3
58	30	9.794070	10.205930	9.900475	10.099525	10.106405	9.893595	30	2
59	45	9.794110	10.205890	9.900540	10.099460	10.106431	9.893569	15	1
60	30	9.794150	10.205850	9.900605	10.099395	10.106456	9.893544	30	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
3h 26m.				LOG. SINES, &c.				51 deg.	

2h 34m.		LOG. SINES, &c.					38 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	30	9.794150	10.205850	9.900605	10.099395	10.106456	9.893544	30	60
1	15	9.794189	10.205811	9.900670	10.099330	10.106481	9.893519	45	59
2	30	9.794229	10.205771	9.900735	10.099265	10.106506	9.893494	30	58
3	45	9.794269	10.205731	9.900800	10.099200	10.106531	9.893469	15	57
4	31	9.794308	10.205692	9.900864	10.099136	10.106556	9.893444	29	56
5	15	9.794348	10.205652	9.900929	10.099071	10.106581	9.893419	45	55
6	30	9.794388	10.205612	9.900994	10.099006	10.106606	9.893394	30	54
7	45	9.794427	10.205573	9.901059	10.098941	10.106632	9.893368	15	53
8	32	9.794467	10.205533	9.901124	10.098876	10.106657	9.893343	28	52
9	15	9.794507	10.205493	9.901189	10.098811	10.106682	9.893318	45	51
10	30	9.794546	10.205454	9.901253	10.098747	10.106707	9.893293	30	50
11	45	9.794586	10.205414	9.901318	10.098682	10.106732	9.893268	15	49
12	33	9.794626	10.205374	9.901383	10.098617	10.106757	9.893243	27	48
13	15	9.794665	10.205335	9.901448	10.098552	10.106783	9.893217	45	47
14	30	9.794705	10.205295	9.901513	10.098487	10.106808	9.893192	30	46
15	45	9.794744	10.205256	9.901577	10.098423	10.106833	9.893167	15	45
16	34	9.794784	10.205216	9.901642	10.098358	10.106858	9.893142	26	44
17	15	9.794824	10.205176	9.901707	10.098293	10.106883	9.893117	45	43
18	30	9.794863	10.205137	9.901772	10.098228	10.106908	9.893092	30	42
19	45	9.794903	10 205097	9.901836	10.098164	10.106934	9.893066	15	41
20	35	9.794942	10.205058	9.901901	10 098099	10.106959	9.893041	25	40
21	15	9.794982	10.205018	9.901966	10.098034	10.106984	9.893016	45	39
22	30	9.795022	10 204978	9.902031	10.097969	10.107009	9.892991	30	38
23	45	9.795061	10.204939	9.902096	10.097904	10.107034	9.892966	15	37
24	36	9.795101	10.204899	9.902160	10.097840	10.107060	9.892940	24	36
25	15	9.795140	10.204860	9.902225	10 097775	10.107085	9.892915	45	35
26	30	9.795180	10.204820	9.902290	10.097710	10.107110	9.892890	30	34
27	45	9.795219	10.204781	9.902355	10.097645	10.107135	9.892865	15	33
28	37	9.795259	10.204741	9.902419	10.097581	10.107161	9.892839	23	32
29	15	9.795298	10.204702	9.902484	10.097516	10.107186	9.892814	45	31
30	30	9.795338	10.204662	9.902549	10.097451	10.107211	9.892789	30	30
31	45	9.795378	10.204622	9.902614	10.097386	10.107236	9.892764	15	29
32	38	9.795417	10.204583	9.902679	10.097321	10.107262	9.892738	22	28
33	15	9.795457	10.204543	9.902743	10.097257	10.107287	9.892713	45	27
34	30	9.795496	10.204504	9.902808	10.097192	10.107312	9.892688	30	26
35	45	9.795536	10.204464	9.902873	10.097127	10.107337	9.892663	15	25
36	39	9.795575	10.204425	9.902938	10.097062	10.107363	9.892637	21	24
37	15	9.795615	10.204385	9.903002	10.096998	10.107388	9.892612	45	23
38	30	9.795654	10.204346	9.903067	10.096933	10.107413	9.892587	30	22
39	45	9.795694	10.204306	9.903132	10.096868	10.107438	9.892562	15	21
40	40	9.795733	10.204267	9.903197	10.096803	10.107464	9 892536	20	20
41	15	9.795772	10.204228	9.903261	10.096739	10.107489	9.892511	45	19
42	30	9.795812	10.204188	9.903326	10.096674	10.107514	9.892486	30	18
43	45	9.795851	10.204149	9.903391	10.096609	10.107539	9.892461	15	17
44	41	9.795891	10.204109	9.903455	10.096545	10.107565	9.892435	19	16
45	15	9.795930	10.204070	9.903520	10.096480	10.107590	9.892410	45	15
46	30	9.795970	10.204030	9.903585	10.096415	10.107615	9.892385	30	14
47	45	9.796009	10.203991	9.903650	10.096350	10.107641	9.892359	15	13
48	42	9.796049	10.203951	9 903714	10.096286	10.107666	9.892334	18	12
49	15	9.796088	10.203912	9.903779	10.096221	10.107691	9.892309	45	11
50	30	9.796127	10.203873	9.903844	10.096156	10.107716	9.892284	30	10
51	45	9.796167	10.203833	9.903909	10.096091	10.107742	9 892258	15	9
52	43	9.796206	10.203794	9.903973	10.096027	10.107767	9.892233	17	8
53	15	9.796246	10.203754	9.904038	10.095962	10.107792	9.892208	45	7
54	30	9.796285	10.203715	9.904103	10.095897	10.107818	9.892182	30	6
55	45	9.796324	10.203676	9.904167	10.095833	10.107843	9.892157	15	5
56	44	9.796364	10.203636	9.904232	10.095768	10.107868	9.892132	16	4
57	15	9.796403	10.203597	9.904297	10.095703	10.107894	9.892106	45	3
58	30	9.796442	10.203558	9.904362	10.095638	10.107919	9.892081	30	2
59	45	9.796482	10.203518	9.904426	10.095574	10.107944	9.892056	15	1
60	45	9.796521	10.203479	9.904491	10.095509	10.107970	9.892030	15	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
8h 25m.		LOG. SINES, &c.					51 deg.		

$2^h\ 35^m$.		LOG. SINES, &c.					38 deg.		
sec.	″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ /	sec.
0	45	9.796521	10.203479	9.904491	10.095509	10.107970	9.892030	15	60
1	15	9.796561	10.203439	9.904556	10.095444	10.107995	9.892005	45	59
2	30	9.796600	10.203400	9.904620	10.095380	10.108020	9.891980	30	58
3	45	9.796639	10.203361	9.904685	10.095315	10.108046	9.891954	15	57
4	46	9.796679	10.203321	9.904750	10.095250	10.108071	9.891929	14	56
5	15	9.796718	10.203282	9.904814	10.095186	10.108097	9.891903	45	55
6	30	9.796757	10.203243	9.904879	10.095121	10.108122	9.891878	30	54
7	45	9.796797	10.203203	9.904944	10.095056	10.108147	9.891853	15	53
8	47	9.796836	10.203164	9.905008	10.094992	10.108173	9.891827	13	52
9	15	9.796875	10.203125	9.905073	10.094927	10.108198	9.891802	45	51
10	30	9.796914	10.203086	9.905138	10.094862	10.108223	9.891777	30	50
11	45	9.796954	10.203046	9.905202	10.094798	10.108249	9.891751	15	49
12	48	9.796993	10.203007	9.905267	10.094733	10.108274	9.891726	12	48
13	15	9.797032	10.202968	9.905332	10.094668	10.108300	9.891700	45	47
14	30	9.797072	10.202928	9.905396	10.094604	10.108325	9.891675	30	46
15	45	9.797111	10.202889	9.905461	10.094539	10.108350	9.891650	15	45
16	49	9.797150	10.202850	9.905526	10.094474	10.108376	9.891624	11	44
17	15	9.797189	10.202811	9.905590	10.094410	10.108401	9.891599	45	43
18	30	9.797229	10.202771	9.905655	10.094345	10.108427	9.891573	30	42
19	45	9.797268	10.202732	9.905720	10.094280	10.108452	9.891548	15	41
20	50	9.797307	10.202693	9.905784	10.094216	10.108477	9.891523	10	40
21	15	9.797346	10.202654	9.905849	10.094151	10.108503	9.891497	45	39
22	30	9.797386	10.202614	9.905914	10.094086	10.108528	9.891472	30	38
23	45	9.797425	10.202575	9.905978	10.094022	10.108554	9 891446	15	37
24	51	9.797464	10.202536	9.906043	10.093957	10.108579	9.891421	9	36
25	15	9.797503	10.202497	9.906108	10.093892	10.108605	9.891395	45	35
26	30	9.797542	10.202458	9 906172	10.093828	10.108630	9.891370	30	34
27	45	9.797582	10.202418	9.906237	10.093763	10.108656	9.891344	15	33
28	52	9.797621	10.202379	9.906302	10.093698	10.108681	9.891219	8	32
29	15	9.797660	10.202340	9.906366	10.093634	10.108706	9.891294	45	31
30	30	9.797699	10.202301	9.906431	10.093569	10.108732	9.891268	30	30
31	45	9.797738	10.202262	9 906496	10.093504	10.108757	9.891243	15	29
32	53	9.797777	10.202223	9.906560	10.093440	10.108783	9.891217	7	28
33	15	9.797817	10 202183	9.906625	10.093375	10.108808	9.891192	45	27
34	30	9.797856	10 202144	9.906689	10.093311	10.108834	9.891166	30	26
35	45	9.797895	10.202105	9.906754	10.093246	10.108859	9.891141	15	25
36	54	9.797934	10.202066	9.906819	10.093181	10.108885	9.891115	6	24
37	15	9.797973	10.202027	9.906883	10.093117	10.108910	9.891090	45	23
38	30	9.798012	10.201988	9.906948	10.093052	10.108936	9.891064	30	22
39	45	9.798051	10.201949	9.907013	10.092987	10 108961	9.891039	15	21
40	55	9.798091	10.201909	9.907077	10.092923	10.108987	9.891013	5	20
41	15	9.798130	10.201870	9.907142	10.092858	10.109012	9.890988	45	19
42	30	9.798169	10.201831	9.907206	10.092794	10.109038	9.890962	30	18
43	45	9.798208	10.201792	9.907271	10.092729	10.109063	9.890937	15	17
44	56	9.798247	10.201753	9 907336	10.092664	10.109089	9.890911	4	16
45	15	9.798286	10.201714	9.907400	10.092600	10.109114	9.890886	45	15
46	30	9.798325	10.201675	9.907465	10.092535	10.109140	9.890860	30	14
47	45	9.798364	10.201636	9.907529	10.092471	10.109165	9.890835	15	13
48	57	9.798403	10.201597	9.907594	10.092406	10.109191	9.890809	3	12
49	15	9.798442	10.201558	9.907659	10.092341	10.109216	9.890784	45	11
50	30	9.798481	10.201519	9.907723	10.092277	10.109242	9.890758	30	10
51	45	9.798521	10.201479	9.907788	10.092212	10.109267	9.890733	15	9
52	58	9.798560	10.201440	9.907852	10.092148	10.109293	9.890707	2	8
53	15	9.798599	10.201401	9.907917	10.092083	10.109319	9.890681	45	7
54	30	9.798638	10.201362	9.907982	10.092018	10.109344	9.890656	30	6
55	45	9.798677	10.201323	9.908046	10.091954	10.109370	9.890630	15	5
56	59	9.798716	10.201284	9.908111	10.091889	10.109395	9.890605	1	4
57	15	9.798755	10.201245	9.908175	10.091825	10.109421	9.890579	45	3
58	30	9.798794	10.201206	9.908240	10.091760	10.109446	9.890554	30	2
59	45	9.798833	10.201167	9.908305	10.091695	10.109472	9.890528	15	1
60	60	9.798872	10.201128	9.908369	10.091631	10.109497	9.890503	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″	sec.
$3^h\ 24^m$.		LOG. SINES, &c.					51 deg.		

2h 36m.				LOG. SINES, &c.			39 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″	sec.
0	0	9.798872	10.201128	9 906369	10.093631	10.109497	9.890503	60	60
1	15	9.798911	10.201089	9.908434	10.091566	10.109523	9.890477	45	59
2	30	9.798950	10.201050	9.908498	10.091502	10.109549	9.890451	30	58
3	45	9.798989	10.201011	9.908563	10.091437	10 109574	9.890426	15	57
4	1	9.799028	10.200972	9.908627	10.091373	10 109600	9.890400	59	56
5	15	9.799067	10.200933	9.908692	10.091308	10.109625	9.890375	45	55
6	30	9.799106	10.200894	9.908757	10.091243	10.109651	9.890349	30	54
7	45	9.799145	10.200855	9.908821	10.091179	10.109677	9.890323	15	53
8	2	9.799184	10.200816	9.908886	10.091114	10.109702	9.890298	58	52
9	15	9.799223	10.200777	9.908950	10.091050	10.109728	9.890272	45	51
10	30	9.799261	10.200739	9 909015	10.090985	10.109753	9.890247	30	50
11	45	9.799300	10.200700	9.909079	10.090921	10.109779	9.890221	15	49
12	3	9.799339	10.200661	9.909144	10.090856	10.109805	9.890195	57	48
13	15	9.799378	10.200622	9.909208	10.090792	10.109830	9.890170	45	47
14	30	9.799417	10.200583	9 909273	10.090727	10.109856	9.890144	30	46
15	45	9.799456	10.200544	9.909338	10.090662	10.109882	9.890118	15	45
16	4	9.799495	10.200505	9.909402	10.090598	10.109907	9.890093	56	44
17	15	9.799534	10.200466	9.909467	10.090533	10.109933	9.890067	45	43
18	30	9.799573	10.200427	9.909531	10.090469	10.109958	9.890042	30	42
19	45	9 799612	10.200388	9.909596	10.090404	10.109984	9.890016	15	41
20	5	9.799651	10.200349	9.909660	10.090340	10.110010	9.889990	55	40
21	15	9.799690	10.200310	9.909725	10.090275	10.110035	9.889965	45	39
22	30	9 799728	10.200272	9.909789	10.090211	10.110061	9.889939	30	38
23	45	9.799767	10.200233	9.909854	10.090146	10.110087	9.889913	15	37
24	6	9.799806	10.200194	9.909918	10.090082	10.110112	9.889888	54	36
25	15	9.799845	10.200155	9.909983	10.090017	10.110138	9.889862	45	35
26	30	9.799884	10.200116	9 910047	10.089953	10.110164	9.889836	30	34
27	45	9.799923	10.200077	9.910112	10.089888	10.110189	9.889811	15	33
28	7	9.799962	10.200038	9.910177	10.089822	10.110215	9.889785	53	32
29	15	9.800000	10.200000	9.910241	10.089759	10.110241	9.889759	45	31
30	30	9.800039	10.199961	9.910306	10.089694	10.110266	9.889734	30	30
31	45	9.800078	10.199922	9.910370	10.089630	10.110292	9.889708	15	29
32	8	9.800117	10.199883	9.910435	10.089565	10.110318	9.889682	52	28
33	15	9.800156	10.199844	9.910499	10.089501	10.110344	9.889656	45	27
34	30	9.800194	10 199806	9.910564	10.089436	10.110369	9.889631	30	26
35	45	9.800233	10.199767	9.910628	10.089372	10.110395	9.889605	15	25
36	9	9.800272	10.199728	9.910693	10.089307	10.110421	9.889579	51	24
37	15	9.800311	10.199689	9.910757	10.089243	10.110446	9.889554	45	23
38	30	9.800350	10.199650	9.910822	10.089178	10.110472	9.889528	30	22
39	45	9.800388	10.199612	9.910886	10.089114	10.110498	9.889502	15	21
40	10	9.800427	10.199573	9.910951	10.089049	10.110524	9.889476	50	20
41	15	9.800466	10.199534	9.911015	10.088985	10.110549	9.889451	45	19
42	30	9.800505	10.199495	9.911080	10.088920	10.110575	9.889425	30	18
43	45	9.800543	10.199457	9.911144	10.088856	10.110601	9.889399	15	17
44	11	9.800582	10.199418	9.911209	10.088791	10.110626	9.889374	49	16
45	15	9.800621	10.199379	9.911273	10.088727	10.110652	9.889348	45	15
46	30	9.800660	10.199340	9.911338	10.088662	10.110678	9.889322	30	14
47	45	9.800698	10.199302	9.911402	10.088598	10.110704	9.889296	15	13
48	12	9.800737	10.199263	9.911467	10.088533	10.110729	9 889271	48	12
49	15	9.800776	10.199224	9.911531	10.088469	10.110755	9.889245	45	11
50	30	9.800815	10.199185	9.911596	10.088404	10.110781	9.889219	30	10
51	45	9.800853	10.199147	9.911660	10.088340	10.110807	9.889193	15	9
52	13	9.800892	10.199108	9.911724	10.088276	10.110833	9.889167	47	8
53	15	9.800931	10.199069	9.911789	10.088211	10.110858	9.889142	45	7
54	30	9.800969	10.199031	9.911853	10.088147	10.110884	9.889116	30	6
55	45	9 801008	10.198992	9.911918	10.088082	10.110910	9.889090	15	5
56	14	9.801047	10.198953	9.911982	10.088018	10.110936	9 889064	46	4
57	15	9.801085	10.198915	9.912047	10.087953	10.110961	9.889039	45	3
58	30	9.801124	10.198876	9.912111	10.087889	10.110987	9.889013	30	2
59	45	9 801163	10.198837	9.912176	10.087824	10.111013	9.888987	15	1
60	15	9.801201	10.198799	9.912240	10.087760	10.111039	9.888961	45	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
3h 23m.				LOG. SINES, &c.			50 deg.		

2h 37m.			LOG. SINES, &c.				39 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	15	9.801201	10.198799	9.912240	10.087760	10.111039	9.888961	45	60
1	15	9.801240	10.198760	9.912305	10.087695	10.111065	9.888935	45	59
2	30	9.801279	10.198721	9.912369	10.087631	10.111090	9.888910	30	58
3	45	9.801317	10.198683	9.912434	10.087566	10 111116	9.888884	15	57
4	16	9.801356	10.198644	9.912498	10.087502	10.111142	9.888858	44	56
5	15	9.801395	10 198605	9.912562	10.087438	10.111168	9.888832	45	55
6	30	9.801433	10.198567	9.912627	10.087373	10.111194	9.888806	30	54
7	45	9.801472	10.198528	9.912691	10.087309	10.111220	9.888780	15	53
8	17	9.801511	10.198489	9.912756	10.087244	10.111245	9.888755	43	52
9	15	9.801549	10.198451	9.912820	10.087180	10.111271	9.888729	45	51
10	30	9 801588	10.198412	9.912885	10.087115	10.111297	9.888703	30	50
11	45	9.801626	10.198374	9.912949	10.087051	10.111323	9.888677	15	49
12	18	9.801665	10.198335	9.913014	10.086986	10.111349	9.888651	42	48
13	15	9.801703	10.198297	9.913078	10.086922	10.111375	9.888625	45	47
14	30	9.801742	10.198258	9.913142	10.086858	10.111400	9.888600	30	46
15	45	9.801781	10.198219	9.913207	10.086793	10.111426	9.888574	15	45
16	19	9 801819	10.198181	9.913271	10.086729	10.111452	9.888548	41	44
17	15	9.801858	10.198142	9.913336	10.086664	10.111478	9.888522	45	43
18	30	9.801896	10.198104	9.913400	10.086600	10.111504	9.888496	30	42
19	45	9.801935	10.198065	9.913465	10.086535	10.111530	9.888470	15	41
20	20	9.801973	10.198027	9.913529	10.086471	10.111556	9.888444	40	40
21	15	9.802012	10.197988	9.913593	10.086407	10.111582	9.888418	45	39
22	30	9.802050	10.197950	9.913658	10.086342	10.111607	9.888393	30	38
23	45	9.802089	10.197911	9.913722	10.086278	10.111633	9.888367	15	37
24	21	9.802128	10.197872	9.913787	10.086213	10.111659	9.888341	39	36
25	15	9.802166	10.197834	9.913851	10.086149	10.111685	9.888315	45	35
26	30	9.802205	10.197795	9.913916	10.086084	10 111711	9.888289	30	34
27	45	9.802243	10.197757	9.913980	10.086020	10.111737	9.888263	15	33
28	22	9 802282	10.197718	9.914044	10.085956	10.111763	9.888237	38	32
29	15	9.802320	10.197680	9.914109	10.085891	10.111789	9.888211	45	31
30	30	9.802359	10.197641	9.914173	10.085827	10.111815	9.888185	30	30
31	45	9.802397	10.197603	9.914238	10.085762	10.111841	9.888159	15	29
32	23	9.802435	10.197565	9.914302	10.085698	10.111867	9.888133	37	28
33	15	9.802474	10.197526	9.914366	10.085634	10.111892	9.888108	45	27
34	30	9.802512	10.197488	9.914431	10.085569	10.111918	9 888082	30	26
35	45	9.802551	10.197449	9.914495	10 085505	10.111944	9.888056	15	25
36	24	9.802589	10.197411	9.914560	10.085440	10.111970	9.888030	36	24
37	15	9.802628	10.197372	9.914624	10.085376	10.111996	9.888004	45	23
38	30	9.802666	10.197334	9.914688	10.085312	10.112022	9.887978	30	22
39	45	9.802705	10.197295	9.914753	10.085247	10.112048	9.887952	15	21
40	25	9.802743	10.197257	9.914817	10.085183	10.112074	9.887926	35	20
41	15	9.802782	10.197218	9.914881	10.085119	10.112100	9.887900	45	19
42	30	9.802820	10.197180	9 914946	10.085054	10.112126	9.887874	30	18
43	45	9.802858	10.197142	9.915010	10.084990	10.112152	9.887848	15	17
44	26	9.802897	10.197103	9.915075	10.084925	10.112178	9.887822	34	16
45	15	9.802935	10.197065	9.915139	10.084861	10.112204	9.887796	45	15
46	30	9.802974	10.197026	9.915203	10.084797	10.112230	9.887770	30	14
47	45	9.803012	10.196988	9.915268	10.084732	10.112256	9.887744	15	13
48	27	9.803050	10.196950	9.915332	10.084668	10.112282	9.887718	33	12
49	15	9 803089	10.196911	9.915396	10.084604	10 112308	9.887692	45	11
50	30	9.803127	10.196873	9.915461	10.084539	10.112334	9 887666	30	10
51	45	9.803165	10.196835	9.915525	10.084475	10.112360	9.887640	15	9
52	28	9.803204	10.196796	9.915590	10.084410	10.112386	9.887614	32	8
53	15	9.803242	10.196758	9.915654	10.084346	10.112412	9.887588	45	7
54	30	9.803280	10.196720	9.915718	10.084282	10.112438	9.887562	30	6
55	45	9.803319	10.196681	9.915783	10.084217	10.112464	9.887536	15	5
56	29	9.803357	10.196643	9.915847	10.084153	10.112490	9.887510	31	4
57	15	9.803396	10.196604	9.915911	10.084089	10.112516	9.887484	45	3
58	30	9.803434	10.196566	9.915976	10.084024	10.112542	9.887458	30	2
59	45	9.803472	10.196528	9.916040	10.083960	10.112568	9.887432	15	1
60	30	9.803510	10.196490	9.916104	10.083896	10.112594	9.887406	30	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
3h 22m.			LOG. SINES, &c.				50 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	2h 38m.		LOG. SINES, &c.				39 deg.		
0	30	9.803510	10.196490	9.916104	10.083896	10.112594	9.887406	30	60
1	15	9.803549	10.196451	9.916169	10 083831	10.112620	9.887380	45	59
2	30	9.803587	10.196413	9.916233	10.083767	10.112646	9.887354	30	58
3	45	9.803625	10.196375	9.916297	10.083703	10.112672	9.887328	15	57
4	31	9.803664	10.196336	9.916362	10.083638	10.112698	9.887302	29	56
5	15	9.803702	10.196298	9.916426	10.083574	10.112724	9.887276	45	55
6	30	9.803740	10.196260	9.916490	10.083510	10.112750	9.887250	30	54
7	45	9.803779	10.196221	9.916555	10.083445	10.112776	9.887224	15	53
8	32	9.803817	10.196183	9.916619	10.083381	10.112802	9.887198	28	52
9	15	9.803855	10.196145	9.916683	10.083317	10.112828	9.887172	45	51
10	30	9.803893	10.196107	9.916748	10.083252	10.112855	9.887145	30	50
11	45	9.803932	10.196068	9.916812	10.083188	10.112881	9.887119	15	49
12	33	9.803970	10.196030	9.916876	10.083124	10.112907	9.887093	27	48
13	15	9.804008	10.195992	9.916941	10.083059	10.112933	9.887067	45	47
14	30	9.804046	10.195954	9.917005	10.082995	10.112959	9.887041	30	46
15	45	9.804085	10.195915	9.917069	10.082931	10 112985	9.887015	15	45
16	34	9.804123	10.195877	9.917134	10.082866	10.113011	9.886989	26	44
17	15	9.804161	10.195839	9.917198	10.082802	10.113037	9.886963	45	43
18	30	9.804199	10.195801	9.917262	10.082738	10.113063	9.886937	30	42
19	45	9.804237	10.195763	9.917327	10.082673	10.113089	9.886911	15	41
20	35	9.804276	10.195724	9.917391	10.082609	10.113115	9.886885	25	40
21	15	9.804314	10.195686	9.917455	10.082545	10.113142	9.886858	45	39
22	30	9.804352	10.195648	9.917520	10.082480	10.113168	9.886832	30	38
23	45	9.804390	10.195610	9.917584	10.082416	10.113194	9.886806	15	37
24	36	9.804428	10.195572	9.917648	10.082352	10.113220	9.886780	24	36
25	15	9.804467	10.195533	9.917713	10.082287	10.113246	9.886754	45	35
26	30	9.804505	10.195495	9.917777	10.082223	10.113272	9.886728	30	34
27	45	9.804543	10.195457	9.917841	10.082159	10.113298	9.886702	15	33
28	37	9.804581	10.195419	9.917905	10.082095	10.113324	9.886676	23	32
29	15	9.804619	10.195381	9.917970	10.082030	10.113351	9.886649	45	31
30	30	9.804657	10.195343	9.918034	10.081966	10.113377	9.886623	30	30
31	45	9.804695	10.195305	9.918098	10.081902	10.113403	9.886597	15	29
32	38	9.804734	10.195266	9.918163	10.081837	10.113429	9.886571	22	28
33	15	9.804772	10.195228	9.918227	10.081773	10.113455	9.886545	45	27
34	30	9.804810	10.195190	9.918291	10.081709	10.113481	9.886519	30	26
35	45	9.804848	10.195152	9.918355	10.081645	10.113508	9.886492	15	25
36	39	9.804886	10.195114	9.918420	10.081580	10.113534	9.886466	21	24
37	15	9.804924	10.195076	9.918484	10.081516	10.113560	9.886440	45	23
38	30	9.804962	10.195038	9.918548	10.081452	10.113586	9.886414	30	22
39	45	9.805000	10.195000	9.918613	10.081387	10.113612	9.886388	15	21
40	40	9.805038	10.194962	9.918677	10.081323	10.113638	9.886362	20	20
41	15	9.805077	10.194923	9.918741	10.081259	10.113665	9 886335	45	19
42	30	9.805115	10.194885	9.918805	10.081195	10.113691	9.886309	30	18
43	45	9.805153	10.194847	9.918870	10.081130	10.113717	9.886283	15	17
44	41	9.805191	10.194809	9.918934	10.081066	10.113743	9.886257	19	16
45	15	9.805229	10.194771	9.918998	10.081002	10.113769	9.886231	45	15
46	30	9.805267	10.194733	9.919063	10.080937	10.113796	9.886204	30	14
47	45	9.805305	10.194695	9.919127	10.080873	10 113822	9.886178	15	13
48	42	9.805343	10.194657	9.919191	10.080809	10.113848	9.886152	18	12
49	15	9.805381	10.194619	9.919255	10.080745	10.113874	9.886126	45	11
50	30	9.805419	10.194581	9.919320	10.080680	10.113901	9.886099	30	10
51	45	9.805457	10.194543	9.919384	10.080616	10.113927	9.886073	15	9
52	43	9.805495	10.194505	9.919448	10.080552	10.113953	9.886047	17	8
53	15	9.805533	10.194467	9.919512	10.080488	10.113979	9.886021	45	7
54	30	9.805571	10.194429	9.919577	10.080423	10.114006	9.885994	30	6
55	45	9.805609	10.194391	9.919641	10.080359	10.114032	9.885968	15	5
56	44	9.805647	10.194353	9.919705	10.080295	10 114058	9.885942	16	4
57	15	9.805685	10.194315	9.919769	10.080231	10.114084	9.885916	45	3
58	30	9.805723	10.194277	9.919834	10.080166	10.114111	9.885889	30	2
59	45	9.805761	10.194239	9.919898	10.080102	10.114137	9.885863	15	1
60	45	9.805799	10.194201	9.919962	10.080038	10.114163	9.885837	15	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	8h 21m.		LOG. SINES, &c.				50 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	$2^h\ 39^m$.		LOG. SINES, &c.				.39 deg.		
0	45	9.805799	10.194201	9.919962	10.080038	10.114163	9.885837	15	60
1	15	9.805837	10.194163	9.920026	10.079974	10.114189	9.885811	45	59
2	30	9.805875	10.194125	9.920091	10.079909	10.114216	9.885784	30	58
3	45	9.805913	10.194087	9.920155	10.079845	10.114242	9.885758	15	57
4	46	9.805951	10.194049	9.920219	10.079781	10.114268	9.885732	14	56
5	15	9.805989	10.194011	9.920283	10.079717	10.114294	9.885706	45	55
6	30	9.806027	10.193973	9.920347	10.079653	10.114321	9.885679	30	54
7	45	9.806065	10.193935	9.920412	10.079588	10.114347	9.885653	15	53
8	47	9.806103	10.193897	9.920476	10.079524	10.114373	9.885627	13	52
9	15	9.806141	10.193859	9.920540	10.079460	10.114400	9.885600	45	51
10	30	9.806179	10.193821	9.920604	10.079396	10.114426	9.885574	30	50
11	45	9.806216	10.193784	9.920669	10.079331	10.114452	9.885548	15	49
12	48	9.806254	10.193746	9.920733	10.079267	10.114479	9.885521	12	48
13	15	9.806292	10.193708	9.920797	10.079203	10.114505	9.885495	45	47
14	30	9.806330	10.193670	9.920861	10.079139	10.114531	9.885469	30	46
15	45	9.806368	10.193632	9.920925	10.079075	10.114557	9.885443	15	45
16	49	9.806406	10.193594	9.920990	10.079010	10.114584	9.885416	11	44
17	15	9.806444	10.193556	9.921054	10.078946	10.114610	9.885390	45	43
18	30	9.806482	10.193518	9.921118	10.078882	10.114636	9.885364	30	42
19	45	9.806520	10.193480	9.921182	10.078818	10.114663	9.885337	15	41
20	50	9.806557	10.193443	9.921247	10.078753	10.114689	9.885311	10	40
21	15	9.806595	10.193405	9.921311	10.078689	10.114716	9.885284	45	39
22	30	9.806633	10.193367	9.921375	10.078625	10.114742	9.885258	30	38
23	45	9.806671	10.193329	9.921439	10.078561	10.114768	9.885232	15	37
24	51	9.806709	10.193291	9.921503	10.078497	10.114795	9.885205	9	36
25	15	9.806747	10.193253	9.921568	10.078432	10.114821	9.885179	45	35
26	30	9.806785	10.193215	9.921632	10.078368	10.114847	9.885153	30	34
27	45	9.806822	10.193178	9.921696	10.078304	10.114874	9.885126	15	33
28	52	9.806860	10.193140	9.921760	10.078240	10.114900	9.885100	8	32
29	15	9.806898	10.193102	9.921824	10.078176	10.114926	9.885074	45	31
30	30	9.806936	10.193064	9.921889	10.078111	10.114953	9.885047	30	30
31	45	9.806974	10.193026	9.921953	10.078047	10.114979	9.885021	15	29
32	53	9.807011	10.192989	9.922017	10.077983	10.115006	9.884994	7	28
33	15	9.807049	10.192951	9.922081	10.077919	10.115032	9.884968	45	27
34	30	9.807087	10.192913	9.922145	10.077855	10.115058	9.884942	30	26
35	45	9.807125	10.192875	9.922209	10.077791	10.115085	9.884915	15	25
36	54	9.807163	10.192837	9.922274	10.077726	10.115111	9.884889	6	24
37	15	9.807200	10.192800	9.922338	10.077662	10.115138	9.884862	45	23
38	30	9.807238	10.192762	9.922402	10.077598	10.115164	9.884836	30	22
39	45	9.807276	10.192724	9.922466	10.077534	10.115190	9.884810	15	21
40	55	9.807314	10.192686	9.922530	10.077470	10 115217	9.884783	5	20
41	15	9.807351	10.192649	9.922595	10.077405	10 115243	9.884757	45	19
42	30	9.807389	10.192611	9.922659	10.077341	10 115270	9.884730	30	18
43	45	9.807427	10.192573	9.922723	10.077277	10 115296	9.884704	15	17
44	56	9.807465	10.192535	9.922787	10.077213	10.115323	9.884677	4	16
45	15	9.807502	10.192498	9.922851	10.077149	10.115349	9.884651	45	15
46	30	9.807540	10.192460	9.922915	10.077085	10.115375	9.884625	30	14
47	45	9.807578	10.192422	9.922980	10.077020	10.115402	9.884598	15	13
48	57	9.807615	10.192385	9.923044	10.076956	10.115428	9.884572	3	12
49	15	9.807653	10.192347	9.923108	10.076892	10.115455	9.884545	45	11
50	30	9.807691	10.192309	9.923172	10.076828	10.115481	9.884519	30	10
51	45	9.807728	10.192272	9.923236	10.076764	10.115508	9.884492	15	9
52	58	9.807766	10.192234	9.923300	10.076700	10.115534	9.884466	2	8
53	15	9.807804	10.192196	9.923364	10.076636	10.115561	9.884439	45	7
54	30	9.807842	10.192158	9.923429	10.076571	10.115587	9.884413	30	6
55	45	9.807879	10.192121	9.923493	10.076507	10.115614	9.884386	15	5
56	59	9.807917	10.192083	9.923557	10.076443	10.115640	9 884360	1	4
57	15	9.807955	10.192045	9.923621	10.076379	10.115667	9.884333	45	3
58	30	9.807992	10.192008	9 923685	10.076315	10.115693	9.884307	30	2
59	45	9.808030	10.191970	9.923749	10.076251	10.115720	9.884280	15	1
60	60	9.808067	10.191933	9.923813	10.076187	10.115746	9.884254	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$3^h\ 20^m$.		LOG. SINES, &c.				50 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
2h 40m.			LOG. SINES, &c.					40 deg.	
0	0	9.808067	10.191933	9.923813	10.076187	10.115746	9.884254	60	60
1	15	9.808105	10.191895	9.923878	10.076122	10.115773	9.884227	45	59
2	30	9.808143	10.191857	9.923942	10.076058	10.115799	9.884201	30	58
3	45	9.808180	10.191820	9.924006	10.075994	10.115826	9.884174	15	57
4	1	9.808218	10.191782	9.924070	10.075930	10.115852	9.884148	59	56
5	15	9.808256	10.191744	9.924134	10.075866	10.115879	9.884121	45	55
6	30	9.808293	10.191707	9.924198	10.075802	10.115905	9.884095	30	54
7	45	9.808331	10.191669	9.924262	10.075738	10.115932	9.884068	15	53
8	2	9.808368	10.191632	9.924327	10.075673	10.115958	9.884042	58	52
9	15	9.808406	10.191594	9.924391	10.075609	10.115985	9.884015	45	51
10	30	9.808444	10.191556	9.924455	10.075545	10.116011	9.883989	30	50
11	45	9.808481	10.191519	9.924519	10.075481	10.116038	9.883962	15	49
12	3	9.808519	10.191481	9.924583	10.075417	10.116064	9.883936	57	48
13	15	9.808556	10.191444	9.924647	10.075353	10.116091	9.883909	45	47
14	30	9.808594	10.191406	9.924711	10.075289	10.116117	9.883883	30	46
15	45	9.808631	10.191369	9.924775	10.075225	10.116144	9.883856	15	45
16	4	9.808669	10.191331	9.924840	10.075160	10.116171	9.883829	56	44
17	15	9.808707	10.191293	9.924904	10.075096	10.116197	9.883803	45	43
18	30	9.808744	10.191256	9.924968	10.075032	10.116224	9.883776	30	42
19	45	9.808782	10.191218	9.925032	10.074968	10.116250	9.883750	15	41
20	5	9.808819	10.191181	9.925096	10.074904	10.116277	9.883723	55	40
21	15	9.808857	10.191143	9.925160	10.074840	10.116303	9.883697	45	39
22	30	9.808894	10.191106	9.925224	10.074776	10.116330	9.883670	30	38
23	45	9.808932	10.191068	9.925288	10.074712	10.116357	9.883643	15	37
24	6	9.808969	10.191031	9.925352	10.074648	10.116383	9.883617	54	36
25	15	9.809007	10.190993	9.925416	10.074584	10.116410	9.883590	45	35
26	30	9.809044	10.190956	9.925481	10.074519	10.116436	9.883564	30	34
27	45	9.809082	10.190918	9.925545	10.074455	10.116463	9.883537	15	33
28	7	9.809119	10.190881	9.925609	10.074391	10.116490	9.883510	53	32
29	15	9.809157	10.190843	9.925673	10.074327	10.116516	9.883484	45	31
30	30	9.809194	10.190806	9.925737	10.074263	10.116543	9.883457	30	30
31	45	9.809232	10.190768	9.925801	10.074199	10.116570	9.883430	15	29
32	8	9.809269	10.190731	9.925865	10.074135	10.116596	9.883404	52	28
33	15	9.809307	10.190693	9.925929	10.074071	10.116623	9.883377	45	27
34	30	9.809344	10.190656	9.925993	10.074007	10.116649	9.883351	30	26
35	45	9.809381	10.190619	9.926057	10.073943	10.116676	9.883324	15	25
36	9	9.809419	10.190581	9.926121	10.073879	10.116703	9.883297	51	24
37	15	9.809456	10.190544	9.926186	10.073814	10.116729	9.883271	45	23
38	30	9.809494	10.190506	9.926250	10.073750	10.116756	9.883244	30	22
39	45	9.809531	10.190469	9.926314	10.073686	10.116783	9.883217	15	21
40	10	9.809569	10.190431	9.926378	10.073622	10.116809	9.883191	50	20
41	15	9.809606	10.190394	9.926442	10.073558	10.116836	9.883164	45	19
42	30	9.809643	10.190357	9.926506	10.073494	10.116863	9.883137	30	18
43	45	9.809681	10.190319	9.926570	10.073430	10.116889	9.883111	15	17
44	11	9.809718	10.190282	9.926634	10.073366	10.116916	9.883084	49	16
45	15	9.809756	10.190244	9.926698	10.073302	10.116943	9.883057	45	15
46	30	9.809793	10.190207	9.926762	10.073238	10.116969	9.883031	30	14
47	45	9.809830	10.190170	9.926826	10.073174	10.116996	9.883004	15	13
48	12	9.809868	10.190132	9.926890	10.073110	10.117023	9.882977	48	12
49	15	9.809905	10.190095	9.926954	10.073046	10.117049	9.882951	45	11
50	30	9.809942	10.190058	9.927018	10.072982	10.117076	9.882924	30	10
51	45	9.809980	10.190020	9.927083	10.072917	10.117103	9.882897	15	9
52	13	9.810017	10.189983	9.927147	10.072853	10.117129	9.882871	47	8
53	15	9.810055	10.189945	9.927211	10.072789	10.117156	9.882844	45	7
54	30	9.810092	10.189908	9.927275	10.072725	10.117183	9.882817	30	6
55	45	9.810129	10.189871	9.927339	10.072661	10.117210	9.882790	15	5
56	14	9.810167	10.189833	9.927403	10.072597	10.117236	9.882764	46	4
57	15	9.810204	10.189796	9.927467	10.072533	10.117263	9.882737	45	3
58	30	9.810241	10.189759	9.927531	10.072469	10.117290	9.882710	30	2
59	45	9.810278	10.189722	9.927595	10.072405	10.117316	9.882684	15	1
60	15	9.810316	10.189684	9.927659	10.072341	10.117343	9.882657	45	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
3h 19m			LOG. SINES, &c.					49 deg.	

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	$2^h\ 41^m$.		LOG. SINES, &c.				40 deg.		
0	15	9.810316	10.189684	9.927659	10.072341	10.117343	9.882657	45	60
1	15	9.810353	10.189647	9.927723	10.072277	10.117370	9.882630	45	59
2	30	9 810390	10.189610	9.927787	10.072213	10.117397	9.882603	30	58
3	45	9.810428	10.189572	9.927851	10.072149	10.117423	9.882577	15	57
4	16	9.810465	10.189535	9.927915	10.072085	10.117450	9.882550	44	56
5	15	9.810502	10.189498	9.927979	10.072021	10.117477	9.882523	45	55
6	30	9.810540	10.189460	9.928043	10.071957	10.117504	9.882496	30	54
7	45	9.810577	10.189423	9.928107	10.071893	10.117530	9.882470	15	53
8	17	9.810614	10.189386	9.928171	10.071829	10.117557	9.882443	43	52
9	15	9.810651	10.189349	9.928235	10.071765	10.117584	9.882416	45	51
10	30	9.810689	10.189311	9.928299	10.071701	10.117611	9.882389	30	50
11	45	9.810726	10.189274	9.928363	10.071637	10.117638	9.882362	15	49
12	18	9.810763	10.189237	9.928427	10.071573	10.117664	9.882336	42	48
13	15	9.810800	10.189200	9.928491	10.071509	10.117691	9.882309	45	47
14	30	9.810838	10.189162	9.928555	10.071445	10.117718	9.882282	30	46
15	45	9.810875	10.189125	9.928619	10.071381	10.117745	9.882255	15	45
16	19	9.810912	10.189088	9.928683	10.071317	10.117772	9.882228	41	44
17	15	9.810949	10.189051	9.928747	10.071253	10.117798	9.882202	45	43
18	30	9.810986	10.189014	9.928812	10.071188	10.117825	9.882175	30	42
19	45	9.811024	10.188976	9.928876	10.071124	10.117852	9.882148	15	41
20	20	9.811061	10.188939	9.928940	10.071060	10.117879	9.882121	40	40
21	15	9.811098	10.188902	9.929004	10.070996	10.117906	9.882094	45	39
22	30	9.811135	10.188865	9.929068	10.070932	10.117932	9.882068	30	38
23	45	9.811172	10.188828	9.929132	10.070868	10.117959	9.882041	15	37
24	21	9.811210	10.188790	9.929196	10.070804	10.117986	9.882014	39	36
25	15	9.811247	10.188753	9.929260	10.070740	10.118013	9.881987	45	35
26	30	9.811284	10.188716	9.929324	10.070676	10.118040	9.881960	30	34
27	45	9.811321	10.188679	9.929388	10.070612	10.118067	9.881933	15	33
28	22	9.811358	10.188642	9.929452	10.070548	10.118093	9.881907	38	32
29	15	9.811395	10.188605	9.929516	10.070484	10.118120	9.881880	45	31
30	30	9.811433	10.188567	9.929580	10.070420	10.118147	9.881853	30	30
31	45	9.811470	10.188530	9.929644	10.070356	10.118174	9.881826	15	29
32	23	9.811507	10.188493	9.929708	10.070292	10.118201	9.881799	37	28
33	15	9 811544	10.188456	9.929772	10.070228	10.118228	9.881772	45	27
34	30	9.811581	10.188419	9.929836	10.070164	10.118255	9.881745	30	26
35	45	9.811618	10.188382	9.929900	10.070100	10.118281	9.881719	15	25
36	24	9.811655	10.188345	9.929964	10.070036	10.118308	9.881692	36	24
37	15	9.811692	10.188308	9.930028	10.069972	10.118335	9.881665	45	23
38	30	9.811730	10.188270	9.930092	10.069908	10.118362	9.881638	30	22
39	45	9.811767	10.188233	9.930156	10.069844	10.118389	9.881611	15	21
40	25	9.811804	10.188196	9.930219	10.069781	10.118416	9.881584	35	20
41	15	9.811841	10.188159	9.930283	10.069717	10 118443	9.881557	45	19
42	30	9.811878	10.188122	9.930347	10.069653	10 118470	9.881530	30	18
43	45	9.811915	10.188085	9.930411	10.069589	10.118497	9.881503	15	17
44	26	9.811952	10.188048	9.930475	10.069525	10.118523	9.881477	34	16
45	15	9.811989	10.188011	9.930539	10.069461	10.118550	9.881450	45	15
46	30	9.812026	10.187974	9.930603	10.069397	10.118577	9.881423	30	14
47	45	9.812063	10.187937	9.930667	10.069333	10.118604	9.881396	15	13
48	27	9.812100	10.187900	9.930731	10.069269	10.118631	9.881369	33	12
49	15	9.812137	10.187863	9.930795	10.069205	10.118658	9.881342	45	11
50	30	9.812174	10.187826	9.930859	10.069141	10.118685	9.881315	30	10
51	45	9.812211	10.187789	9.930923	10.069077	10.118712	9.881288	15	9
52	28	9.812248	10.187752	9.930987	10.069013	10.118739	9.881261	32	8
53	15	9.812285	10.187715	9.931051	10.068949	10.118766	9.881234	45	7
54	30	9.812322	10.187678	9.931115	10.068885	10.118793	9.881207	30	6
55	45	9.812359	10.187641	9.931179	10.068821	10 118820	9.881180	15	5
56	29	9.812396	10.187604	9.931243	10.068757	10.118847	9.881153	31	4
57	15	9.812433	10.187567	9.931307	10.068693	10.118874	9.881126	45	3
58	30	9.812470	10.187530	9.931371	10.068629	10.118901	9.881099	30	2
59	45	9.812507	10.187493	9.931435	10.068565	10.118928	9.881072	15	1
60	30	9.812544	10.187456	9.931499	10.068501	10.118955	9.881045	30	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$3^h\ 18^m$.		LOG. SINES, &c.				49 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	$2^h\ 42^m$.		LOG. SINES, &c.				40 deg.		
0	30	9.812544	10.187456	9.931499	10.068501	10.118955	9.881045	30	60
1	15	9.812581	10.187419	9.931563	10.068437	10.118982	9.881018	45	59
2	30	9.812618	10.187382	9.931627	10.068373	10.119006	9.880992	30	58
3	45	9.812655	10.187345	9.931691	10.068309	10.119035	9.880965	15	57
4	31	9.812692	10.187308	9.931755	10.068245	10.119062	9.880938	29	56
5	15	9.812729	10.187271	9.931819	10.068181	10.119089	9.880911	45	55
6	30	9.812766	10.187234	9.931883	10.068117	10.119116	9.880884	30	54
7	45	9.812803	10.187197	9.931946	10.068054	10.119143	9.880857	15	53
8	32	9.812840	10.187160	9.932010	10.067990	10.119170	9.880830	28	52
9	15	9.812877	10.187123	9.932074	10.067926	10.119197	9.880803	45	51
10	30	9.812914	10.187086	9.932138	10.067862	10.119224	9.880776	30	50
11	45	9.812951	10.187049	9.932202	10.067798	10.119251	9.880749	15	49
12	33	9.812988	10.187012	9.932266	10.067734	10.119279	9.880721	27	48
13	15	9.813025	10.186975	9.932330	10.067670	10.119306	9.880694	45	47
14	30	9.813062	10.186938	9.932394	10.067606	10.119333	9.880667	30	46
15	45	9.813098	10.186902	9.932458	10.067542	10.119360	9.880640	15	45
16	34	9.813135	10.186865	9.932522	10.067478	10.119387	9.880613	26	44
17	15	9.813172	10.186828	9.932586	10.067414	10.119414	9.880586	45	43
18	30	9.813209	10.186791	9.932650	10.067350	10.119441	9.880559	30	42
19	45	9.813246	10.186754	9.932714	10.067286	10.119468	9.880532	15	41
20	35	9.813283	10.186717	9.932778	10.067222	10.119495	9.880505	25	40
21	15	9.813320	10.186680	9.932842	10.067158	10.119522	9.880478	45	39
22	30	9.813357	10.186643	9.932905	10.067095	10.119549	9.880451	30	38
23	45	9.813393	10.186607	9.932969	10.067031	10.119576	9.880424	15	37
24	36	9.813430	10.186570	9.933033	10.066967	10.119603	9.880397	24	36
25	15	9.813467	10.186533	9.933097	10.066903	10.119630	9.880370	45	35
26	30	9.813504	10.186496	9.933161	10.066839	10.119657	9.880343	30	34
27	45	9.813541	10.186459	9.933225	10.066775	10.119684	9.880316	15	33
28	37	9.813578	10.186422	9.933289	10.066711	10.119711	9.880289	23	32
29	15	9.813614	10.186386	9.933353	10.066647	10.119738	9.880262	45	31
30	30	9.813651	10.186349	9.933417	10.066583	10.119766	9.880234	30	30
31	45	9.813688	10.186312	9.933481	10.066519	10.119793	9.880207	15	29
32	38	9.813725	10.186275	9.933545	10.066455	10.119820	9.880180	22	28
33	15	9.813762	10.186238	9.933609	10.066391	10.119847	9.880153	45	27
34	30	9.813799	10.186201	9.933672	10.066328	10.119874	9.880126	30	26
35	45	9.813835	10.186165	9.933736	10.066264	10.119901	9.880099	15	25
36	39	9.813872	10.186128	9.933800	10.066200	10.119928	9.880072	21	24
37	15	9.813909	10.186091	9.933864	10.066136	10.119955	9.880045	45	23
38	30	9.813946	10.186054	9.933928	10.066072	10.119982	9.880018	30	22
39	45	9.813982	10.186018	9.933992	10.066008	10.120010	9.879990	15	21
40	40	9.814019	10.185981	9.934056	10.065944	10.120037	9.879963	20	20
41	15	9.814056	10.185944	9.934120	10.065880	10.120064	9.879936	45	19
42	30	9.814093	10.185907	9.934184	10.065816	10.120091	9.879909	30	18
43	45	9.814129	10.185871	9.934247	10.065753	10.120118	9.879882	15	17
44	41	9.814166	10.185834	9.934311	10.065689	10.120145	9.879855	19	16
45	15	9.814203	10.185797	9.934375	10.065625	10.120172	9.879828	45	15
46	30	9.814240	10.185760	9.934439	10.065561	10.120200	9.879800	30	14
47	45	9.814276	10.185724	9.934503	10.065497	10.120227	9.879773	15	13
48	42	9.814313	10.185687	9.934567	10.065433	10.120254	9.879746	18	12
49	15	9.814350	10.185650	9.934631	10.065369	10.120281	9.879719	45	11
50	30	9.814387	10.185613	9.934695	10.065305	10.120308	9.879692	30	10
51	45	9.814423	10.185577	9.934759	10.065241	10.120335	9.879665	15	9
52	43	9.814460	10.185540	9.934822	10.065178	10.120363	9.879637	17	8
53	15	9.814497	10.185503	9.934886	10.065114	10.120390	9.879610	45	7
54	30	9.814533	10.185467	9.934950	10.065050	10.120417	9.879583	30	6
55	45	9.814570	10.185430	9.935014	10.064986	10.120444	9.879556	15	5
56	44	9.814607	10.185393	9.935078	10.064922	10.120471	9.879529	16	4
57	15	9.814643	10.185357	9.935142	10.064858	10.120499	9.879501	45	3
58	30	9.814680	10.185320	9.935206	10.064794	10.120526	9.879474	30	2
59	45	9.814717	10.185283	9.935270	10.064730	10.120553	9.879447	15	1
60	45	9.814753	10.185247	9.935333	10.064667	10.120580	9.879420	15	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$3^h\ 17^m$.		LOG. SINES, &c.				49 deg.		

2h 43m.			LOG. SINES, &c.				40 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	45	9.814753	10.185247	9.935333	10.064667	10.120580	9.879420	15	60
1	15	9.814790	10.185210	9.935397	10.064603	10.120607	9.879393	45	59
2	30	9.814827	10.185173	9.935461	10.064539	10.120635	9.879365	30	58
3	45	9.814863	10.185137	9.935525	10.064475	10.120662	9.879338	15	57
4	46	9.814900	10.185100	9.935589	10.064411	10.120689	9.879311	14	56
5	15	9.814937	10.185063	9.935653	10.064347	10.120716	9.879284	45	55
6	30	9.814973	10.185027	9.935717	10.064283	10.120744	9.879256	30	54
7	45	9.815010	10.184990	9.935780	10.064220	10.120771	9.879229	15	53
8	47	9.815046	10.184954	9.935844	10.064156	10.120798	9.879202	13	52
9	15	9.815083	10.184917	9.935908	10.064092	10.120825	9.879175	45	51
10	30	9.815120	10.184880	9.935972	10.064028	10.120852	9.879148	30	50
11	45	9.815156	10.184844	9.936036	10.063964	10.120880	9.879120	15	49
12	48	9.815193	10.184807	9.936100	10.063900	10.120907	9.879093	12	48
13	15	9.815229	10.184771	9.936164	10.063836	10.120934	9.879066	45	47
14	30	9.815266	10.184734	9.936227	10.063773	10.120962	9.879038	30	46
15	45	9.815303	10.184697	9.936291	10.063709	10.120989	9.879011	15	45
16	49	9.815339	10.184661	9.936355	10.063645	10.121016	9.878984	11	44
17	15	9.815376	10.184624	9.936419	10.063581	10.121043	9.878957	45	43
18	30	9.815412	10.184588	9.936483	10.063517	10.121071	9.878929	30	42
19	45	9.815449	10.184551	9.936547	10.063453	10.121098	9.878902	15	41
20	50	9.815485	10.184515	9.936610	10.063390	10.121125	9.878875	10	40
21	15	9.815522	10.184478	9.936674	10.063326	10.121153	9.878847	45	39
22	30	9.815558	10.184442	9.936738	10.063262	10.121180	9.878820	30	38
23	45	9.815595	10.184405	9.936802	10.063198	10.121207	9.878793	15	37
24	51	9.815631	10.184369	9.936866	10.063134	10.121234	9.878766	9	36
25	15	9.815668	10 184332	9.936930	10.063070	10.121262	9.878738	45	35
26	30	9.815704	10.184296	9.936994	10.063006	10.121289	9.878711	30	34
27	45	9.815741	10.184259	9.937057	10.062943	10.121316	9.878684	15	33
28	52	9.815778	10.184222	9.937121	10.062879	10.121344	9.878656	8	32
29	15	9.815814	10.184186	9.937185	10.062815	10.121371	9.878629	45	31
30	30	9.815851	10.184149	9.937249	10.062751	10.121398	9.878602	30	30
31	45	9.815887	10.184113	9.937313	10.062687	10.121426	9.878574	15	29
32	53	9.815923	10.184077	9.937376	9.062624	10.121453	9.878547	7	28
33	15	9.815960	10.184040	9.937440	10.062560	10.121480	9.878520	45	27
34	30	9.815996	10.184004	9 937504	10.062496	10.121508	9.878492	30	26
35	45	9.816033	10.183967	9.937568	10.062432	10.121535	9.878465	15	25
36	54	9.816069	10.183931	9.937632	10.062368	10.121562	9.878438	6	24
37	15	9.816106	10.183894	9.937696	10.062304	10.121590	9.878410	45	23
38	30	9.816142	10.183858	9.937759	10.062241	10.121617	9.878383	30	22
39	45	9.816179	10.183821	9.937823	10.062177	10.121645	9 878355	15	21
40	55	9.816215	10.183785	9.937887	10.062113	10.121672	9.878328	5	20
41	15	9.816252	10.183748	9.937951	10.062049	10.121699	9.878301	45	19
42	30	9.816288	10.183712	9.938015	10.061985	10.121727	9.878273	30	18
43	45	9.816324	10.183676	9.938078	10.061922	10.121754	9.878246	15	17
44	56	9.816361	10.183639	9.938142	10.061858	10.121781	9.878219	4	16
45	15	9.816397	10.183603	9.938206	10.061794	10.121809	9.878191	45	15
46	30	9.816434	10.183566	9.938270	10.061730	10.121836	9.878164	30	14
47	45	9.816470	10.183530	9.938334	10.061666	10.121864	9.878136	15	13
48	57	9.816507	10.183493	9.938397	10.061603	10.121891	9.878109	3	12
49	15	9.816543	10.183457	9.938461	10.061539	10.121918	9.878082	45	11
50	30	9 816579	10.183421	9.938525	10.061475	10.121946	9.878054	30	10
51	45	9.816616	10.183384	9.938589	10.061411	10.121973	9.878027	15	9
52	58	9.816652	10.183348	9.938653	10.061347	10.122001	9.877999	2	8
53	15	9.816688	10.183312	9.938716	10.061284	10.122028	9.877972	45	7
54	30	9.816725	10.183275	9.938780	10.061220	10.122056	9.877944	30	6
55	45	9.816761	10.183239	9.938844	10.061156	10.122083	9.877917	15	5
56	59	9.816797	10.183203	9.938908	10.061092	10.122110	9.877890	1	4
57	15	9.816834	10.183166	9.938972	10.061028	10.122138	9.877862	45	3
58	30	9 816870	10.183130	9.939035	10.060965	10.122165	9.877835	30	2
59	45	9.816907	10.183093	9.939099	10.060901	10.122193	9.877807	15	1
60	60	9.816943	10.183057	9.939163	10.060837	10.122220	9.877780	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
3h 16m.			LOG. SINES, &c.				49 deg.		

2h 44m.			LOG. SINES, &c.				41 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	0	9.816943	10.183057	9.939163	10.060837	10.122220	9.877780	60	60
1	15	9.816979	10.183021	9.939227	10.060773	10.122248	9.877752	45	59
2	30	9.817016	10.182984	9.939291	10.060709	10.122275	9.877725	30	58
3	45	9.817052	10.182948	9.939354	10.060646	10.122303	9.877697	15	57
4	1	9.817088	10.182912	9.939418	10.060582	10.122330	9.877670	59	56
5	15	9.817124	10.182876	9.939482	10.060518	10.122358	9.877642	45	55
6	30	9.817161	10.182839	9.939546	10.060454	10.122385	9.877615	30	54
7	45	9.817197	10.182803	9.939609	10.060391	10.122412	9.877588	15	53
8	2	9.817233	10.182767	9.939673	10.060327	10.122440	9.877560	58	52
9	15	9.817270	10.182730	9.939737	10.060263	10.122467	9.877533	45	51
10	30	9.817306	10.182694	9.939801	10.060199	10.122495	9.877505	30	50
11	45	9.817342	10.182658	9.939865	10.060135	10.122522	9.877478	15	49
12	3	9.817378	10.182622	9.939928	10.060072	10.122550	9.877450	57	48
13	15	9.817415	10.182585	9.939992	10.060008	10.122577	9.877423	45	47
14	30	9.817451	10.182549	9.940056	10.059944	10.122605	9.877395	30	46
15	45	9.817487	10.182513	9.940120	10.059880	10.122632	9.877368	15	45
16	4	9.817523	10.182477	9.940183	10.059817	10.122660	9.877340	56	44
17	15	9.817560	10.182440	9.940247	10.059753	10.122687	9.877313	45	43
18	30	9.817596	10.182404	9.940311	10.059689	10.122715	9.877285	30	42
19	45	9.817632	10.182368	9.940375	10.059625	10.122743	9.877257	15	41
20	5	9.817668	10.182332	9.940438	10.059562	10.122770	9.877230	55	40
21	15	9.817705	10.182295	9.940502	10.059498	10.122798	9.877202	45	39
22	30	9.817741	10.182259	9.940566	10.059434	10.122825	9.877175	30	38
23	45	9.817777	10.182223	9.940630	10.059370	10.122853	9.877147	15	37
24	6	9.817813	10.182187	9.940694	10.059306	10.122880	9.877120	54	36
25	15	9.817849	10.182151	9.940757	10.059243	10.122908	9.877092	45	35
26	30	9.817886	10.182114	9.940821	10.059179	10.122935	9.877065	30	34
27	45	9.817922	10.182078	9.940885	10.059115	10.122963	9.877037	15	33
28	7	9.817958	10.182042	9.940949	10.059051	10.122990	9.877010	53	32
29	15	9.817994	10.182006	9.941012	10.058988	10.123018	9.876982	45	31
30	30	9.818030	10.181970	9.941076	10.058924	10.123046	9.876954	30	30
31	45	9.818067	10.181933	9.941140	10.058860	10.123073	9.876927	15	29
32	8	9.818103	10.181897	9.941204	10.058796	10.123101	9.876899	52	28
33	15	9.818139	10.181861	9.941267	10.058733	10.123128	9.876872	45	27
34	30	9.818175	10.181825	9.941331	10.058669	10.123156	9.876844	30	26
35	45	9.818211	10.181789	9.941395	10.058605	10.123184	9.876816	15	25
36	9	9.818247	10.181753	9.941458	10.058542	10.123211	9.876789	51	24
37	15	9.818283	10.181717	9.941522	10.058478	10.123239	9.876761	45	23
38	30	9.818320	10.181680	9.941586	10.058414	10.123266	9.876734	30	22
39	45	9.818356	10.181644	9.941650	10.058350	10.123294	9.876706	15	21
40	10	9.818392	10.181608	9.941713	10.058287	10.123322	9.876678	50	20
41	15	9.818428	10.181572	9.941777	10.058223	10.123349	9.876651	45	19
42	30	9.818464	10.181536	9.941841	10.058159	10.123377	9.876623	30	18
43	45	9.818500	10.181500	9.941905	10.058095	10.123404	9.876596	15	17
44	11	9.818536	10.181464	9.941968	10.058032	10.123432	9.876568	49	16
45	15	9.818572	10.181428	9.942032	10.057968	10.123460	9.876540	45	15
46	30	9.818609	10.181391	9.942096	10.057904	10.123487	9.876513	30	14
47	45	9.818645	10.181355	9.942160	10.057840	10.123515	9.876485	15	13
48	12	9.818681	10.181319	9.942223	10.057777	10.123543	9.876457	48	12
49	15	9.818717	10.181283	9.942287	10.057713	10.123570	9.876430	45	11
50	30	9.818753	10.181247	9.942351	10.057649	10.123598	9.876402	30	10
51	45	9.818789	10.181211	9.942414	10.057586	10.123626	9.876374	15	9
52	13	9.818825	10.181175	9.942478	10.057522	10.123653	9.876347	47	8
53	15	9.818861	10.181139	9.942542	10.057458	10.123681	9.876319	45	7
54	30	9.818897	10.181103	9.942606	10.057394	10.123709	9.876291	30	6
55	45	9.818933	10.181067	9.942669	10.057331	10.123736	9.876264	15	5
56	14	9.818969	10.181031	9.942733	10.057267	10.123764	9.876236	46	4
57	15	9.819005	10.180995	9.942797	10.057203	10.123792	9.876208	45	3
58	30	9.819041	10.180959	9.942860	10.057140	10.123819	9.876181	30	2
59	45	9.819077	10.180923	9.942924	10.057076	10.123847	9.876153	15	1
60	15	9.819113	10.180887	9.942988	10.057012	10.123875	9.876125	45	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
3h 15m.			LOG. SINES, &c.				48 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	$2^h\ 45^m$.		LOG. SINES, &c.				41 deg.		
0	15	9.819113	10.180887	9.942988	10.057012	10.123875	9.876125	45	60
1	15	9.819149	10.180851	9.943052	10.056948	10.123902	9.876098	45	59
2	30	9.819185	10.180815	9.943115	10.056885	10.123930	9.876070	30	58
3	45	9.819221	10.180779	9.943179	10.056821	10.123958	9.876042	15	57
4	16	9.819257	10.180743	9.943243	10.056757	10.123986	9.876014	44	56
5	15	9.819293	10.180707	9.943306	10.056694	10.124013	9 875987	45	55
6	30	9.819329	10.180671	9.943370	10.056630	10.12404]	9.875959	30	54
7	45	9.819365	10.180635	9.943434	10.056566	10.124069	9.875931	15	53
8	17	9.819401	10.180599	9.943498	10.056502	10.124096	9.875904	43	52
9	15	9.819437	10.180563	9.943561	10.056439	10 124124	9.875876	45	51
10	30	9.819473	10.180527	9.943625	10.056375	10.124152	9 875848	30	50
11	45	9.819509	10.180491	9.943689	10.056311	10.124180	9.875820	15	49
12	18	9.819545	10.180455	9.943752	10.056248	10.124207	9.875793	42	48
13	15	9.819581	10.180419	9.943816	10.056184	10.124235	9.875765	45	47
14	30	9.819617	10.180383	9.943880	10.056120	10.124263	9.875737	30	46
15	45	9.819653	10.180347	9.943943	10.056057	10.124291	9.875709	15	45
16	19	9.819689	10.180311	9.944007	10.055993	10.124318	9.875682	41	44
17	15	9.819725	10.180275	9.944071	10.055929	10.124346	9.875654	45	43
18	30	9.819761	10.180239	9 944134	10.055866	10.124374	9.875626	30	42
19	45	9.819797	10.180203	9.944198	10.055802	10.124402	9.875598	15	41
20	20	9.819832	10.180168	9.944262	10.055738	10.124429	9.875571	40	40
21	15	9.819868	10.180132	9.944326	10.055674	10.124457	9.875543	45	39
22	30	9.819904	10.180096	9.944389	10.055611	10.124485	9.875515	30	38
23	45	9.819940	10.180060	9.944453	10.055547	10.124513	9.875487	15	37
24	21	9.819976	10.180024	9.944517	10.055483	10.124541	9.875459	39	36
25	15	9.820012	10.179988	9.944580	10.055420	10.124568	9.875432	45	35
26	30	9.820048	10.179952	9.944644	10.055356	10 124596	9.875404	30	34
27	45	9.820084	10.179916	9.944708	10.055292	10.124624	9 875376	15	33
28	22	9.820120	10.179880	9.944771	10.055229	10.124652	9.875348	38	32
29	15	9.820155	10.179845	9.944835	10.055165	10.124680	9.875320	45	31
30	30	9.820191	10.179809	9.944899	10.055101	10.124707	9.875293	30	30
31	45	9.820227	10.179773	9.944962	10.055038	10.124735	9.875265	15	29
32	23	9.820263	10.179737	9.945026	10.054974	10.124763	9.875237	37	28
33	15	9.820299	10.179701	9.945090	10.054910	10.124791	9.875209	45	27
34	30	9.820335	10.179665	9.945153	10.054847	10.124819	9.875181	30	26
35	45	9.820370	10.179630	9.945217	10.054783	10.124847	9.875153	15	25
36	24	9.820406	10.179594	9.945281	10.054719	10.124874	9.875126	36	24
37	15	9.820442	10.179558	9.945344	10.054656	10.124902	9.875098	45	23
38	30	9.820478	10.179522	9.945408	10.054592	10.124930	9.875070	30	22
39	45	9.820514	10.179486	9.945472	10.054528	10.124958	9.875042	15	21
40	25	9.820550	10.179450	9.945535	10.054465	10.124986	9.875014	35	20
41	15	9.820585	10.179415	9.945599	10.054401	10.125014	9.874986	45	19
42	30	9.820621	10.179379	9.945663	10.054337	10.125042	9.874958	30	18
43	45	9.820657	10.179343	9.945726	10.054274	10.125069	9.874931	15	17
44	26	9.820693	10.179307	9.945790	10.054210	10.125097	9.874903	34	16
45	15	9.820728	10.179272	9.945854	10.054146	10.125125	9.874875	45	15
46	30	9.820764	10.179236	9.945917	10.054083	10.125153	9.874847	30	14
47	45	9.820800	10.179200	9.945981	10.054019	10.125181	9.874819	15	13
48	27	9.820836	10.179164	9.946045	10.053955	10.125209	9.874791	33	12
49	15	9.820872	10.179128	9.946108	10.053892	10.125237	9.874763	45	11
50	30	9 820907	10.179093	9.946172	10.053828	10.125265	9.874735	30	10
51	45	9.820943	10.179057	9.946236	10.053764	10.125293	9.874707	15	9
52	28	9.820979	10.179021	9.946299	10.053701	10.125321	9.874679	32	8
53	15	9.821015	10.178985	9.946363	10.053637	10.125348	9.874652	45	7
54	30	9.821050	10.178950	9.946427	10.053573	10.125376	9.874624	30	6
55	45	9.821086	10.178914	9.946490	10.053510	10.125404	9.874596	15	5
56	29	9.821122	10.178878	9.946554	10.053446	10.125432	9.874568	31	4
57	15	9.821157	10.178843	9.946617	10.053383	10.125460	9.874540	45	3
58	30	9.821193	10.178807	9.946681	10.053319	10.125488	9.874512	30	2
59	45	9.821229	10.178771	9.946745	10.053255	10.125516	9.874484	15	1
60	30	9.821265	10.178735	9.946808	10.053192	10.125544	9.874456	30	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$3^h\ 14^m$		LOG. SINES, &c.				48 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	$2^h\ 46^m$.		LOG. SINES, &c.				41 deg.		
0	30	9.821265	10.178735	9.946808	10 053192	10.125544	9.874456	30	60
1	15	9.821300	10.178700	9.946872	10.053128	10.125572	9.874428	45	59
2	30	9.821336	10.178664	9.946936	10.053064	10.125600	9.874400	30	58
3	45	9.821372	10.178628	9.946999	10.053001	10.125628	9.874372	15	57
4	31	9.821407	10.178593	9.947063	10.052937	10.125656	9.874344	29	56
5	15	9 821443	10.178557	9.947127	10.052873	10.125684	9.874316	45	55
6	30	9.821479	10.178521	9.947190	10.052810	10.125712	9.874288	30	54
7	45	9.821514	10.178486	9.947254	10.052746	10.125740	9.874260	15	53
8	32	9.821550	10.178450	9.947317	10.052683	10 125768	9.874232	28	52
9	15	9.821586	10.178414	9.947381	10.052619	10.125796	9.874204	45	51
10	30	9.821621	10.178379	9.947445	10.052555	10.125824	9.874176	30	50
11	45	9.821657	10.178343	9.947508	10.052492	10.125852	9.874148	15	49
12	33	9.821693	10.178307	9.947572	10.052428	10.125880	9.874120	27	48
13	15	9.821728	10.178272	9.947636	10.052364	10.125908	9.874092	45	47
14	30	9.821764	10.178236	9.947699	10.052301	10.125935	9.874065	30	46
15	45	9.821799	10.178201	9.947763	10.052237	10.125963	9.874037	15	45
16	34	9.821835	10.178165	9.947826	10.052174	10.125992	9.874008	26	44
17	15	9.821871	10.178129	9.947890	10.052110	10.126020	9.873980	45	43
18	30	9.821906	10.178094	9.947954	10.052046	10.126048	9.873952	30	42
19	45	9.821942	10.178058	9.948017	10.051983	10.126076	9.873924	15	41
20	35	9.821977	10.178023	9.948081	10.051919	10.126104	9.873896	25	40
21	15	9 822013	10.177987	9.948145	10.051855	10.126132	9.873868	45	39
22	30	9.822049	10.177951	9.948208	10.051792	10.126160	9.873840	30	38
23	45	9.822084	10.177916	9.948272	10.051728	10.126188	9.873812	15	37
24	36	9.822120	10.177880	9.948335	10.051665	10.126216	9.873784	24	36
25	15	9.822155	10.177845	9 948399	10.051601	10.126244	9.873756	45	35
26	30	9.822191	10.177809	9.948463	10.051537	10.126272	9.873728	30	34
27	45	9.822226	10.177774	9.948526	10.051474	10.126300	9.873700	15	33
28	37	9.822262	10.177738	9.948590	10.051410	10.126328	9.873672	23	32
29	15	9.822298	10.177702	9.948653	10.051347	10.126356	9.873644	45	31
30	30	9.822333	10.177667	9.948717	10.051283	10.126384	9.873616	30	30
31	45	9.822369	10.177631	9.948781	10.051219	10.126412	9.873588	15	29
32	38	9.822404	10.177596	9.948844	10.051156	10.126440	9.873560	22	28
33	15	9.822440	10.177560	9.948908	10.051092	10.126468	9.873532	45	27
34	30	9.822475	10.177525	9.948971	10.051029	10.126496	9.873504	30	26
35	45	9.822511	10.177489	9.949035	10.050965	10.126524	9.873476	15	25
36	39	9.822546	10.177454	9.949099	10.050901	10.126552	9.873448	21	24
37	15	9.822582	10.177418	9.949162	10.050838	10.126581	9.873419	45	23
38	30	9.822617	10.177383	9.949226	10.050774	10.126609	9.873391	30	22
39	45	9.822653	10.177347	9.949289	10.050711	10.126637	9.873363	15	21
40	40	9.822688	10.177312	9.949353	10.050647	10.126665	9.873335	20	20
41	15	9.822724	10.177276	9.949417	10.050583	10.126693	9.873307	45	19
42	30	9.822759	10.177241	9.949480	10.050520	10.126721	9.873279	30	18
43	45	9.822795	10.177205	9.949544	10.050456	10.126749	9.873251	15	17
44	41	9.822830	10.177170	9.949607	10.050393	10.126777	9.873223	19	16
45	15	9.822866	10.177134	9.949671	10.050329	10.126805	9.873195	45	15
46	30	9.822901	10.177099	9.949735	10.050265	10.126834	9.873166	30	14
47	45	9.822937	10.177063	9 949798	10.050202	10.126862	9.873138	15	13
48	42	9.822972	10.177028	9.949862	10.050138	10.126890	9.873110	18	12
49	15	9.823007	10.176993	9.949925	10.050075	10.126918	9.873082	45	11
50	30	9.823043	10.176957	9.949989	10.050011	10.126946	9.873054	30	10
51	45	9.823078	10.176922	9.950053	10.049947	10.126974	9.873026	15	9
52	43	9.823114	10.176886	9.950116	10.049884	10.127002	9.872998	17	8
53	15	9.823149	10.176851	9.950180	10.049820	10.127031	9.872969	45	7
54	30	9.823185	10.176815	9.950243	10.049757	10.127059	9.872941	30	6
55	45	9.823220	10.176780	9.950307	10.049693	10.127087	9.872913	15	5
56	44	9.823255	10.176745	9.950370	10.049630	10.127115	9.872885	16	4
57	15	9.823291	10.176709	9.950434	10.049566	10.127143	9.872857	45	3
58	30	9.823326	10.176674	9.950498	10.049502	10.127171	9.872829	30	2
59	45	9.823362	10.176638	9.950561	10.049439	10.127200	9.872800	15	1
60	45	9.823397	10.176603	9.950625	10.049375	10.127228	9.872772	15	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$3^h\ 13^m$.		LOG. SINES, &c.				48 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	$2^h\ 47^m$.		LOG. SINES, &c.				41 deg.		
0	45	9.823397	10.176603	9.950025	10.049375	10.127228	9.872772	15	60
1	15	9.823432	10.176568	9.950088	10.049312	10.127256	9.872744	45	59
2	30	9.823468	10.176532	9.950752	10.049248	10.127284	9.872716	30	58
3	45	9.823503	10.176497	9.950815	10.049185	10.127312	9.872688	15	57
4	46	9.823539	10.176461	9.950879	10.049121	10.127341	9.872659	14	56
5	15	9.823574	10.176426	9.950943	10.049057	10.127369	9.872631	45	55
6	30	9.823609	10.176391	9.951006	10.048994	10.127397	9.872603	30	54
7	45	9.823645	10.176355	9.951070	10.048930	10.127425	9.872575	15	53
8	47	9.823680	10.176320	9.951133	10.048867	10.127453	9.872547	13	52
9	15	9.823715	10.176285	9.951197	10.048803	10.127482	9.872518	45	51
10	30	9.823751	10.176249	9.951260	10.048740	10.127510	9.872490	30	50
11	45	9.823786	10.176214	9.951324	10.048676	10.127538	9.872462	15	49
12	48	9.823821	10.176179	9.951388	10.048612	10.127566	9.872434	12	48
13	15	9.823857	10.176143	9.951451	10.048549	10.127595	9.872405	45	47
14	30	9.823892	10.176108	9.951515	10.048485	10.127623	9.872377	30	46
15	45	9.823927	10.176073	9.951578	10.048422	10.127651	9.872349	15	45
16	49	9.823963	10.176037	9.951642	10.048358	10.127679	9.872321	11	44
17	15	9.823998	10.176002	9.951705	10.048295	10.127708	9.872292	45	43
18	30	9.824033	10.175967	9.951769	10.048231	10.127736	9.872264	30	42
19	45	9.824068	10.175932	9.951833	10.048167	10.127764	9.872236	15	41
20	50	9.824104	10.175896	9.951896	10.048104	10.127792	9.872208	10	40
21	15	9.824139	10.175861	9.951960	10.048040	10.127821	9.872179	45	39
22	30	9.824174	10.175826	9.952023	10.047977	10.127849	9.872151	30	38
23	45	9.824210	10.175790	9.952087	10.047913	10.127877	9.872123	15	37
24	51	9.824245	10.175755	9.952150	10.047850	10.127906	9.872094	9	36
25	15	9.824280	10.175720	9.952214	10.047786	10.127934	9.872066	45	35
26	30	9.824315	10.175685	9.952277	10.047723	10.127962	9.872038	30	34
27	45	9.824351	10.175649	9.952341	10.047659	10.127990	9.872010	15	33
28	52	9.824386	10.175614	9.952404	10.047596	10.128019	9.871981	8	32
29	15	9.824421	10.175579	9.952468	10.047532	10.128047	9.871953	45	31
30	30	9.824456	10.175544	9.952532	10.047468	10.128075	9.871925	30	30
31	45	9.824491	10.175509	9.952595	10.047405	10.128104	9.871896	15	29
32	53	9.824527	10.175473	9.952659	10.047341	10.128132	9.871868	7	28
33	15	9.824562	10.175438	9.952722	10.047278	10.128160	9.871840	45	27
34	30	9.824597	10.175403	9.952786	10.047214	10.128189	9.871811	30	26
35	45	9.824632	10.175368	9.952849	10.047151	10.128217	9.871783	15	25
36	54	9.824668	10.175332	9.952913	10.047087	10.128245	9.871755	6	24
37	15	9.824703	10.175297	9.952976	10.047024	10.128274	9.871726	45	23
38	30	9.824738	10.175262	9.953040	10.046960	10.128302	9.871698	30	22
39	45	9.824773	10.175227	9.953103	10.046897	10.128330	9.871670	15	21
40	55	9.824808	10.175192	9.953167	10.046833	10.128359	9.871641	5	20
41	15	9.824843	10.175157	9.953230	10.046770	10.128387	9.871613	45	19
42	30	9.824879	10.175121	9.953294	10.046706	10.128415	9.871585	30	18
43	45	9.824914	10.175086	9.953358	10.046642	10.128444	9.871556	15	17
44	56	9.824949	10.175051	9.953421	10.046579	10.128472	9.871528	4	16
45	15	9.824984	10.175016	9.953485	10.046515	10.128501	9.871499	45	15
46	30	9.825019	10.174981	9.953548	10.046452	10.128529	9.871471	30	14
47	45	9.825054	10.174946	9.953612	10.046388	10.128557	9.871443	15	13
48	57	9.825090	10.174910	9.953675	10.046325	10.128586	9.871414	3	12
49	15	9.825125	10.174875	9.953739	10.046261	10.128614	9.871386	45	11
50	30	9.825160	10.174840	9.953802	10.046198	10.128642	9.871358	30	10
51	45	9.825195	10.174805	9.953866	10.046134	10.128671	9.871329	15	9
52	58	9.825230	10.174770	9.953929	10.046071	10.128699	9.871301	2	8
53	15	9.825265	10.174735	9.953993	10.046007	10.128728	9.871272	45	7
54	30	9.825300	10.174700	9.954056	10.045944	10.128756	9.871244	30	6
55	45	9.825335	10.174665	9.954120	10.045880	10.128784	9.871216	15	5
56	59	9.825370	10.174630	9.954183	10.045817	10.128813	9.871187	1	4
57	15	9.825406	10.174594	9.954247	10.045753	10.128841	9.871159	45	3
58	30	9.825441	10.174559	9.954310	10.045690	10.128870	9.871130	30	2
59	45	9.825476	10.174524	9.954374	10.045626	10.128898	9.871102	15	1
60	60	9.825511	10.174489	9.954437	10.045563	10.128927	9.871073	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$3^h\ 12^m$.		LOG. SINES, &c.				48 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	2h 48m.		LOG. SINES, &c.				42 deg.		
0	0	9.825511	10.174489	9.954437	10.045563	10.128927	9.871073	60	60
1	15	9.825546	10.174454	9.954501	10.045499	10.128955	9.871045	45	59
2	30	9.825581	10.174419	9.954564	10.045436	10.128983	9.871017	30	58
3	45	9.825616	10.174384	9.954628	10.045372	10.129012	9.870988	15	57
4	1	9.825651	10.174349	9.954691	10.045309	10.129040	9.870960	59	56
5	15	9.825686	10.174314	9.954755	10.045245	10.129069	9.870931	45	55
6	30	9.825721	10.174279	9.954818	10.045182	10.129097	9.870903	30	54
7	45	9.825756	10.174244	9.954882	10.045118	10.129126	9.870874	15	53
8	2	9.825791	10.174209	9.954945	10.045055	10.129154	9.870846	58	52
9	15	9.825826	10.174174	9.955009	10.044991	10.129183	9.870817	45	51
10	30	9.825861	10.174139	9.955072	10.044928	10.129211	9.870789	30	50
11	45	9.825896	10.174104	9.955136	10.044864	10.129240	9.870760	15	49
12	3	9.825931	10.174069	9.955199	10.044801	10.129268	9.870732	57	48
13	15	9.825966	10.174034	9.955263	10.044737	10.129297	9.870703	45	47
14	30	9.826001	10.173999	9.955326	10.044674	10.129325	9.870675	30	46
15	45	9.826036	10.173964	9.955390	10.044610	10.129354	9.870646	15	45
16	4	9.826071	10.173929	9.955453	10.044547	10.129382	9.870618	56	44
17	15	9.826106	10.173894	9.955517	10.044483	10.129411	9.870589	45	43
18	30	9.826141	10.173859	9.955580	10.044420	10.129439	9.870561	30	42
19	45	9.826176	10.173824	9.955644	10.044356	10.129468	9.870532	15	41
20	5	9.826211	10.173789	9.955707	10.044293	10.129496	9.870504	55	40
21	15	9.826246	10.173754	9.955771	10.044229	10.129525	9.870475	45	39
22	30	9.826281	10.173719	9.955834	10.044166	10.129553	9.870447	30	38
23	45	9.826316	10.173684	9.955898	10.044102	10.129582	9.870418	15	37
24	6	9.826351	10.173649	9.955961	10.044039	10.129610	9.870390	54	36
25	15	9.826386	10.173614	9.956025	10.043975	10.129639	9.870361	45	35
26	30	9.826421	10.173579	9.956088	10.043912	10.129667	9.870333	30	34
27	45	9.826456	10.173544	9.956152	10.043848	10.129696	9.870304	15	33
28	7	9.826491	10.173509	9.956215	10.043785	10.129724	9.870276	53	32
29	15	9.826526	10.173474	9.956279	10.043721	10.129753	9.870247	45	31
30	30	9.826561	10.173439	9.956342	10.043658	10.129782	9.870218	30	30
31	45	9.826596	10.173404	9.956406	10.043594	10.129810	9.870190	15	29
32	8	9.826631	10.173369	9.956469	10.043531	10.129839	9.870161	52	28
33	15	9.826666	10.173334	9.956533	10.043467	10.129867	9.870133	45	27
34	30	9.826700	10.173300	9.956596	10.043404	10.129896	9.870104	30	26
35	45	9.826735	10.173265	9.956660	10.043340	10.129924	9.870076	15	25
36	9	9.826770	10.173230	9.956723	10.043277	10.129953	9.870047	51	24
37	15	9.826805	10.173195	9.956787	10.043213	10.129982	9.870018	45	23
38	30	9.826840	10.173160	9.956850	10.043150	10.130010	9.869990	30	22
39	45	9.826875	10.173125	9.956914	10.043086	10.130039	9.869961	15	21
40	10	9.826910	10.173090	9.956977	10.043023	10.130067	9.869933	50	20
41	15	9.826945	10.173055	9.957041	10.042959	10.130096	9.869904	45	19
42	30	9.826980	10.173020	9.957104	10.042896	10.130125	9.869875	30	18
43	45	9.827014	10.172986	9.957168	10.042832	10.130153	9.869847	15	17
44	11	9.827049	10.172951	9.957231	10.042769	10.130182	9.869818	49	16
45	15	9.827084	10.172916	9.957295	10.042705	10.130210	9.869790	45	15
46	30	9.827119	10.172881	9.957358	10.042642	10.130239	9.869761	30	14
47	45	9.827154	10.172846	9.957421	10.042579	10.130268	9.869732	15	13
48	12	9.827189	10.172811	9.957485	10.042515	10.130296	9.869704	48	12
49	15	9.827223	10.172777	9.957548	10.042452	10.130325	9.869675	45	11
50	30	9.827258	10.172742	9.957612	10.042388	10.130354	9.869646	30	10
51	45	9.827293	10.172707	9.957675	10.042325	10.130382	9.869618	15	9
52	13	9.827328	10.172672	9.957739	10.042261	10.130411	9.869589	47	8
53	15	9.827363	10.172637	9.957802	10.042198	10.130440	9.869560	45	7
54	30	9.827398	10.172602	9.957866	10.042134	10.130468	9.869532	30	6
55	45	9.827432	10.172568	9.957929	10.042071	10.130497	9.869503	15	5
56	14	9.827467	10.172533	9.957993	10.042007	10.130526	9.869474	46	4
57	15	9.827502	10.172498	9.958056	10.041944	10.130554	9.869446	45	3
58	30	9.827537	10.172463	9.958120	10.041880	10.130583	9.869417	30	2
59	45	9.827571	10.172429	9.958183	10.041817	10.130612	9.869388	15	1
60	15	9.827606	10.172394	9.958246	10.041754	10.130640	9.869360	45	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	3h 11m.		LOG. SINES, &c.				47 deg.		

2h 49m.			LOG. SINES, &c.				42 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	15	9.827606	10.172394	9 958246	10.041754	10.130640	9.869360	45	60
1	15	9.827641	10.172359	9 958310	10.041690	10.130669	9.869331	45	59
2	30	9.827676	10.172324	9 958373	10.041627	10.130698	9.869302	30	58
3	45	9.827711	10.172289	9 958437	10.041563	10 130726	9.869274	15	57
4	16	9.827745	10.172255	9.958500	10.041500	10.130755	9.869245	44	56
5	15	9.827780	10.172220	9.958564	10 041436	10.130784	9.869216	45	55
6	30	9.827815	10.172185	9 958627	10.041373	10.130813	9.869187	30	54
7	45	9.827849	10.172151	9.958691	10.041309	10.130841	9.869159	15	53
8	17	9.827884	10.172116	9.958754	10.041246	10.130870	9.869130	43	52
9	15	9.827919	10.172081	9.958818	10.041182	10.130899	9.869101	45	51
10	30	9.827954	10.172046	9.958881	10.041119	10.130927	9.869073	30	50
11	45	9.827988	10.172012	9.958944	10.041056	10.130956	9.869044	15	49
12	18	9.828023	10.171977	9 959008	10.040992	10.130985	9.869015	42	48
13	15	9.828058	10.171942	9.959071	10 040929	10.131014	9.868986	45	47
14	30	9.828092	10.171908	9.959135	10.040865	10.131042	9 868958	30	46
15	45	9.828127	10.171873	9.959198	10.040802	10.131071	9.868929	15	45
16	19	9.828162	10 171838	9.959262	10.040738	10.131100	9.868900	41	44
17	15	9.828197	10.171803	9.959325	10.040675	10.131129	9.868871	45	43
18	30	9.828231	10.171769	9.959389	10.040611	10.131157	9.868843	30	42
19	45	9.828266	10.171734	9.959452	10.040548	10.131186	9.868814	15	41
20	20	9.828301	10.171699	9 959515	10.040485	10.131215	9.868785	40	40
21	15	9.828335	10 171665	9.959579	10 040421	10.131244	9.868756	45	39
22	30	9.828370	10.171630	9.959642	10 040358	10.131272	9.868728	30	38
23	45	9.828405	10.171595	9.959706	10 040294	10.131301	9.868699	15	37
24	21	9.828439	10.171561	9.959769	10.040231	10.131330	9.868670	39	36
25	15	9.828474	10.171526	9.959833	10.040167	10.131359	9.868641	45	35
26	30	9.828509	10.171491	9.959896	10.040104	10.131388	9.868612	30	34
27	45	9.828543	10.171457	9.959960	10.040040	10.131416	9.868584	15	33
28	22	9.828578	10.171422	9.960023	10.039977	10.131445	9.868555	38	32
29	15	9.828612	10.171388	9.960086	10.039914	10.131474	9.868526	45	31
30	30	9.828647	10.171353	9.960150	10.039850	10.131503	9.868497	30	30
31	45	9.828682	10.171318	9.960213	10.039787	10.131532	9.868468	15	29
32	23	9.828716	10.171284	9 960277	10.039723	10.131560	9.868440	37	28
33	15	9.828751	10.171249	9.960340	10.039660	10.131589	9.868411	45	27
34	30	9.828785	10.171215	9.960404	10.039596	10.131618	9.868382	30	26
35	45	9.828820	10.171180	9.960467	10.039533	10.131647	9.868353	15	25
36	24	9.828855	10.171145	9.960530	10.039470	10.131676	9.868324	36	24
37	15	9.828889	10.171111	9.960594	10.039406	10.131705	9.868295	45	23
38	30	9.828924	10.171076	9.960657	10.039343	10.131734	9.868266	30	22
39	45	9.828958	10.171042	9.960721	10.039279	10.131762	9.868238	15	21
40	25	9.828993	10.171007	9.960784	10.039216	10.131791	9.868209	35	20
41	15	9.829028	10.170972	9.960848	10.039152	10.131820	9.868180	45	19
42	30	9.829062	10.170938	9.960911	10.039089	10.131849	9.868151	30	18
43	45	9.829097	10.170903	9.960974	10.039026	10.131878	9.868122	15	17
44	26	9.829131	10.170869	9.961038	10.038962	10.131907	9.868093	34	16
45	15	9.829166	10.170834	9.961101	10.038899	10.131936	9.868064	45	15
46	30	9.829200	10.170800	9.961165	10.038835	10.131964	9.868036	30	14
47	45	9.829235	10.170765	9.961228	10.038772	10.131993	9.868007	15	13
48	27	9.829269	10.170731	9.961291	10.038709	10.132022	9.867978	33	12
49	15	9.829304	10.170696	9.961355	10.038645	10.132051	9.867949	45	11
50	30	9.829338	10.170662	9.961418	10.038582	10.132080	9.867920	30	10
51	45	9.829373	10.170627	9.961482	10.038518	10.132109	9.867891	15	9
52	28	9.829407	10.170593	9.961545	10.038455	10.132138	9.867862	32	8
53	15	9.829442	10.170558	9.961609	10.038391	10.132167	9.867833	45	7
54	30	9.829476	10.170524	9.961672	10.038328	10.132196	9.867804	30	6
55	45	9.829511	10.170489	9.961735	10.038265	10.132225	9.867775	15	5
56	29	9.829545	10.170455	9.961799	10.038201	10.132253	9.867747	31	4
57	15	9.829580	10.170420	9.961862	10.038138	10.132282	9.867718	45	3
58	30	9.829614	10.170386	9.961926	10.038074	10.132311	9.867689	30	2
59	45	9.829649	10.170351	9.961989	10.038011	10.132340	9.867660	15	1
60	30	9.829683	10.170317	9.962052	10.037948	10.132369	9.867631	30	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
3 10m.			LOG. SINES, &c.				47 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	2h 50m.		LOG. SINES, &c.				42 deg.		
0	30	9.829683	10.170317	9.962052	10.037948	10.132369	9.867631	30	60
1	15	9.829718	10.170282	9.962116	10.037884	10.132398	9.867602	45	59
2	30	9.829752	10.170248	9.962179	10.037821	10.132427	9.867573	30	58
3	45	9.829787	10.170213	9.962243	10.037757	10.132456	9.867544	15	57
4	31	9.829821	10.170179	9.962306	10.037694	10.132485	9.867515	29	56
5	15	9.829856	10.170144	9.962369	10.037631	10.132514	9.867486	45	55
6	30	9.829890	10.170110	9.962433	10.037567	10.132543	9.867457	30	54
7	45	9.829924	10.170076	9.962496	10.037504	10.132572	9.867428	15	53
8	32	9.829959	10.170041	9.962560	10.037440	10.132601	9.867399	28	52
9	15	9.829993	10.170007	9.962623	10.037377	10.132630	9.867370	45	51
10	30	9.830028	10.169972	9.962686	10.037314	10.132659	9.867341	30	50
11	45	9.830062	10.169938	9.962750	10.037250	10.132688	9 867312	15	49
12	33	9.830097	10.169903	9.962813	10.037187	10.132717	9.867283	27	48
13	15	9.830131	10.169869	9.962877	10.037123	10.132746	9.867254	45	47
14	30	9.830165	10.169835	9.962940	10.037060	10.132775	9.867225	30	46
15	45	9.830200	10.169800	9.963003	10.036997	10.132804	9.867196	15	45
16	34	9.830234	10.169766	9.963067	10.036933	10.132833	9.867167	26	44
17	15	9.830269	10.169731	9.963130	10.036870	10.132862	9.867138	45	43
18	30	9.830303	10.169697	9.963194	10.036806	10.132891	9.867109	30	42
19	45	9.830337	10.169663	9.963257	10.036743	10.132920	9.867080	15	41
20	35	9.830372	10.169628	9.963320	10.036680	10.132949	9.867051	25	40
21	15	9.830406	10.169594	9.963384	10.036616	10.132978	9.867022	45	39
22	30	9.830440	10.169560	9.963447	10.036553	10.133007	9.866993	30	38
23	45	9.830475	10.169525	9.963511	10.036489	10.133036	9.866964	15	37
24	36	9.830509	10.169491	9.963574	10.036426	10.133065	9.866935	24	36
25	15	9.830543	10.169457	9.963637	10.036363	10.133094	9.866906	45	35
26	30	9.830578	10.169422	9.963701	10.036299	10.133123	9.866877	30	34
27	45	9.830612	10.169388	9.963764	10.036236	10.133152	9.866848	15	33
28	37	9.830646	10.169354	9.963827	10.036173	10.133181	9.866819	23	32
29	15	9.830681	10.169319	9.963891	10.036109	10.133210	9.866790	45	31
30	30	9.830715	10.169285	9.963954	10.036046	10.133239	9.866761	30	30
31	45	9.830749	10.169251	9.964018	10.035982	10.133268	9.866732	15	29
32	38	9.830784	10.169216	9.964081	10.035919	10.133297	9.866703	22	28
33	15	9.830818	10.169182	9.964144	10 035856	10.133326	9.866674	45	27
34	30	9.830852	10.169148	9.964208	10.035792	10.133356	9.866644	30	26
35	45	9.830887	10.169113	9.964271	10.035729	10.133385	9.866615	15	25
36	39	9.830921	10.169079	9.964335	10.035665	10.133414	9.866586	21	24
37	15	9.830955	10.169045	9.964398	10.035602	10.133443	9.866557	45	23
38	30	9.830989	10.169011	9.964461	10.035539	10.133472	9.866528	30	22
39	45	9.831024	10.168976	9.964525	10.035475	10.133501	9.866499	15	21
40	40	9.831058	10.168942	9.964588	10.035412	10.133530	9.866470	20	20
41	15	9.831092	10.168908	9.964651	10.035349	10.133559	9.866441	45	19
42	30	9.831126	10.168874	9.964715	10.035285	10.133588	9.866412	30	18
43	45	9.831161	10.168839	9.964778	10.035222	10.133618	9.866382	15	17
44	41	9.831195	10.168805	9.964842	10.035158	10.133647	9.866353	19	16
45	15	9.831229	10.168771	9.964905	10.035095	10.133676	9.866324	45	15
46	30	9.831263	10.168737	9.964968	10.035032	10.133705	9.866295	30	14
47	45	9.831298	10.168702	9.965032	10.034968	10.133734	9.866266	15	13
48	42	9.831332	10.168668	9.965095	10.034905	10.133763	9.866237	18	12
49	15	9.831366	10.168634	9.965158	10.034842	10.133792	9.866208	45	11
50	30	9.831400	10.168600	9.965222	10.034778	10.133821	9.866179	30	10
51	45	9.831435	10.168565	9.965285	10.034715	10.133851	9.866149	15	9
52	43	9.831469	10.168531	9.965349	10.034651	10.133880	9.866120	17	8
53	15	9.831503	10.168497	9.965412	10.034588	10.133909	9.866091	45	7
54	30	9.831537	10.168463	9.965475	10.034525	10.133938	9.866062	30	6
55	45	9.831571	10.168429	9.965539	10.034461	10.133967	9.866033	15	5
56	44	9.831606	10.168394	9.965602	10.034398	10.133996	9.866004	16	4
57	15	9.831640	10.168360	9.965665	10.034335	10.134026	9.865974	45	3
58	30	9.831674	10.168326	9.965729	10.034271	10.134055	9.865945	30	2
59	45	9.831708	10.168292	9.965792	10.034208	10.134084	9.865916	15	1
60	45	9.831742	10.168258	9.965855	10.034145	10.134113	9.865887	15	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	3h 9m.		LOG. SINES, &c.				47 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	$2^h\ 51^m$.		LOG. SINES, &c.				42 deg.		
0	45	9.831742	10.168258	9.965855	10.034145	10.134113	9.865887	15	60
1	15	9.831776	10 168224	9.965919	10.034081	10.134142	9.865858	45	59
2	30	9 831811	10.168189	9.965982	10.034018	10,134172	9.865828	30	58
3	45	9.831845	10.168155	9.966045	10.033955	10.134201	9.865799	15	57
4	46	9.831879	10.168121	9.966109	10.033891	10.134230	9.865770	14	56
5	15	9.831913	10.168087	9.966172	10.033828	10.134259	9.865741	45	55
6	30	9.831947	10.168053	9.966236	10.033764	10.134288	9.865712	30	54
7	45	9.831981	10.168019	9.966299	10.033701	10.134318	9.865682	15	53
8	47	9.832015	10.167985	9.966362	10.033638	10.134347	9.865653	13	52
9	15	9.832050	10.167950	9.966426	10.033574	10.134376	9.865624	45	51
10	30	9.832084	10.167916	9.966489	10.033511	10.134405	9.865595	30	50
11	45	9.832118	10.167882	9.966552	10.033448	10.134435	9.865565	15	49
12	48	9.832152	10.167848	9.966616	10.033384	10.134464	9.865536	12	48
13	15	9.832186	10.167814	9.966679	10.033321	10.134493	9.865507	45	47
14	30	9.832220	10.167780	9.966742	10.033258	10.134522	9.865478	30	46
15	45	9.832254	10.167746	9.966806	10.033194	10.134552	9.865448	15	45
16	49	9.832288	10.167712	9.966869	10.033131	10.134581	9.865419	11	44
17	15	9.832322	10.167678	9.966932	10.033068	10.134610	9.865390	45	43
18	30	9.832356	10.167644	9.966996	10.033004	10.134639	9.865361	30	42
19	45	9.832391	10.167609	9.967059	10.032941	10.134669	9.865331	15	41
20	50	9.832425	10.167575	9.967122	10.032878	10.134698	9.865302	10	40
21	15	9.832459	10.167541	9.967186	10.032814	10.134727	9.865273	45	39
22	30	9.832493	10.167507	9.967249	10.032751	10.134757	9.865243	30	38
23	45	9.832527	10.167473	9.967313	10 032687	10.134786	9 865214	15	37
24	51	9.832561	10.167439	9.967376	10.032624	10.134815	9.865185	9	36
25	15	9.832595	10.167405	9.967439	10.032561	10.134844	9.865156	45	35
26	30	9.832629	10.167371	9.967503	10.032497	10.134874	9.865126	30	34
27	45	9.832663	10.167337	9.967566	10.032434	10.134903	9.865097	15	33
28	52	9.832697	10.167303	9.967629	10.032371	10.134932	9.865068	8	32
29	15	9.832731	10.167269	9.967693	10.032307	10.134962	9.865038	45	31
30	30	9.832765	10.167235	9.967756	10.032244	10.134991	9.865009	30	30
31	45	9.832799	10.167201	9.967819	10.032181	10.135020	9.864980	15	29
32	53	9.832833	10.167167	9.967883	10.032117	10.135050	9.864950	7	28
33	15	9.832867	10.167133	9.967946	10.032054	10.135079	9.864921	45	27
34	30	9.832901	10.167099	9.968009	10.031991	10.135108	9.864892	30	26
35	45	9.832935	10.167065	9.968073	10.031927	10.135138	9.864862	15	25
36	54	9.832969	10.167031	9.968136	10.031864	10.135167	9.864833	6	24
37	15	9.833003	10.166997	9.968199	10.031801	10.135196	9.864804	45	23
38	30	9.833037	10.166963	9.968263	10.031737	10.135226	9.864774	30	22
39	45	9.833071	10.166929	9.968326	10.031674	10.135255	9.864745	15	21
40	55	9.833105	10.166895	9.968389	10.031611	10.135284	9.864716	5	20
41	15	9.833139	10.166861	9.968453	10.031547	10.135314	9.864686	45	19
42	30	9.833173	10.166827	9.968516	10.031484	10.135343	9.864657	30	18
43	45	9.833207	10.166793	9.968579	10.031421	10.135373	9.864627	15	17
44	56	9.833241	10.166759	9.968643	10.031357	10.135402	9.864598	4	16
45	15	9.833275	10.166725	9.968706	10.031294	10.135431	9.864569	45	15
46	30	9.833309	10.166691	9.968769	10.031231	10.135461	9.864539	30	14
47	45	9.833343	10.166657	9.968833	10.031167	10.135490	9.864510	15	13
48	57	9.833377	10.166623	9.968896	10.031104	10.135519	9.864481	3	12
49	15	9.833410	10.166590	9.968959	10.031041	10.135549	9.864451	45	11
50	30	9.833444	10.166556	9.969023	10.030977	10.135578	9.864422	30	10
51	45	9.833478	10.166522	9.969086	10.030914	10.135608	9.864392	15	9
52	58	9.833512	10.166488	9.969149	10.030851	10.135637	9.864363	2	8
53	15	9.833546	10.166454	9.969213	10.030787	10.135667	9.864333	45	7
54	30	9.833580	10.166420	9.969276	10.030724	10.135696	9.864304	30	6
55	45	9.833614	10.166386	9.969339	10.030661	10.135725	9.864275	15	5
56	59	9.833648	10.166352	9.969403	10.030597	10.135755	9.864245	1	4
57	15	9.833682	10.166318	9.969466	10.030534	10.135784	9.864216	45	3
58	30	9.833716	10.166284	9.969529	10.030471	10.135814	9.864186	30	2
59	45	9.833749	10.166251	9.969592	10.030408	10.135843	9.864157	15	1
60	60	9.833783	10.166217	9.969656	10.030344	10.135873	9.864127	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$3^h\ 8^m$.		LOG. SINES, &c.				47 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	$2^h\ 52^m$.		LOG. SINES, &c.				43 deg.		
0	0	9.833783	10.166217	9.969656	10.030344	10.135873	9.864127	60	60
1	15	9.833817	10.166183	9.969719	10.030281	10.135902	9.864098	45	59
2	30	9.833851	10.166149	9.969782	10.030218	10.135931	9.864069	30	58
3	45	9.833885	10.166115	9.969846	10.030154	10.135961	9.864039	15	57
4	1	9.833919	10.166081	9.969909	10.030091	10.135990	9.864010	59	56
5	15	9.833953	10.166047	9.969972	10.030028	10.136020	9.863980	45	55
6	30	9.833986	10.166014	9.970036	10.029964	10.136049	9.863951	30	54
7	45	9.834020	10.165980	9.970099	10.029901	10.136079	9.863921	15	53
8	2	9.834054	10.165946	9.970162	10.029838	10.136108	9.863892	58	52
9	15	9.834088	10.165912	9.970226	10.029774	10.136138	9.863862	45	51
10	30	9.834122	10.165878	9.970289	10.029711	10.136167	9.863833	30	50
11	45	9.834156	10.165844	9.970352	10.029648	10.136197	9.863803	15	49
12	3	9.834189	10.165811	9.970416	10.029584	10.136226	9.863774	57	48
13	15	9.834223	10.165777	9.970479	10.029521	10.136256	9.863744	45	47
14	30	9.834257	10.165743	9.970542	10.029458	10.136285	9.863715	30	46
15	45	9.834291	10.165709	9.970606	10.029394	10.136315	9.863685	15	45
16	4	9.834325	10.165675	9.970669	10.029331	10.136344	9.863656	56	44
17	15	9.834358	10.165642	9.970732	10.029268	10.136374	9.863626	45	43
18	30	9.834392	10.165608	9.970795	10.029205	10.136403	9.863597	30	42
19	45	9.834426	10.165574	9.970859	10.029141	10.136433	9.863567	15	41
20	5	9.834460	10.165540	9.970922	10.029078	10.136462	9.863538	55	40
21	15	9.834493	10.165507	9.970985	10.029015	10.136492	9.863508	45	39
22	30	9.834527	10.165473	9.971049	10.028951	10.136522	9.863478	30	38
23	45	9.834561	10.165439	9.971112	10.028888	10.136551	9.863449	15	37
24	6	9.834595	10.165405	9.971175	10.028825	10.136581	9.863419	54	36
25	15	9.834628	10.165372	9.971239	10.028761	10.136610	9.863390	45	35
26	30	9.834662	10.165338	9.971302	10.028698	10.136640	9.863360	30	34
27	45	9.834696	10.165304	9.971365	10.028635	10.136669	9.863331	15	33
28	7	9.834730	10.165270	9.971429	10.028571	10.136699	9.863301	53	32
29	15	9.834763	10.165237	9.971492	10.028508	10.136728	9.863272	45	31
30	30	9.834797	10.165203	9.971555	10.028445	10.136758	9.863242	30	30
31	45	9.834831	10.165169	9.971618	10.028382	10.136788	9.863212	15	29
32	8	9.834865	10.165135	9.971682	10.028318	10.136817	9.863183	52	28
33	15	9.834898	10.165102	9.971745	10.028255	10.136847	9.863153	45	27
34	30	9.834932	10.165068	9.971808	10.028192	10.136876	9.863124	30	26
35	45	9.834966	10.165034	9.971872	10.028128	10.136906	9.863094	15	25
36	9	9.834999	10.165001	9.971935	10.028065	10.136936	9.863064	51	24
37	15	9.835033	10.164967	9.971998	10.028002	10.136965	9.863035	45	23
38	30	9.835067	10.164933	9.972062	10.027938	10.136995	9.863005	30	22
39	45	9.835100	10.164900	9.972125	10.027875	10.137024	9.862976	15	21
40	10	9.835134	10.164866	9.972188	10.027812	10.137054	9.862946	50	20
41	15	9.835168	10.164832	9.972251	10.027749	10.137084	9.862916	45	19
42	30	9.835201	10.164799	9.972315	10.027685	10.137113	9.862887	30	18
43	45	9.835235	10.164765	9.972378	10.027622	10.137143	9.862857	15	17
44	11	9.835269	10.164731	9.972441	10.027559	10.137173	9.862827	49	16
45	15	9.835302	10.164698	9.972505	10.027495	10.137202	9.862798	45	15
46	30	9.835336	10.164664	9.972568	10.027432	10.137232	9.862768	30	14
47	45	9.835370	10.164630	9.972631	10.027369	10.137262	9.862738	15	13
48	12	9.835403	10.164597	9.972694	10.027306	10.137291	9.862709	48	12
49	15	9.835437	10.164563	9.972758	10.027242	10.137321	9.862679	45	11
50	30	9.835471	10.164529	9.972821	10.027179	10.137351	9.862649	30	10
51	45	9.835504	10.164496	9.972884	10.027116	10.137380	9.862620	15	9
52	13	9.835538	10.164462	9.972948	10.027052	10.137410	9.862590	47	8
53	15	9.835571	10.164429	9.973011	10.026989	10.137440	9.862560	45	7
54	30	9.835605	10.164395	9.973074	10.026926	10.137469	9.862531	30	6
55	45	9.835639	10.164361	9.973137	10.026863	10.137499	9.862501	15	5
56	14	9.835672	10.164328	9.973201	10.026799	10.137529	9.862471	46	4
57	15	9.835706	10.164294	9.973264	10.026736	10.137558	9.862442	45	3
58	30	9.835739	10.164261	9.973327	10.026673	10.137588	9.862412	30	2
59	45	9.835773	10.164227	9.973391	10.026609	10.137618	9.862382	15	1
60	15	9.835807	10.164193	9.973454	10.026546	10.137647	9.862353	45	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$3^h\ 7^m$.		LOG. SINES, &c.				46 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	2h 53m.		LOG. SINES, &c.				43 deg.		
0	15	9.835807	10.164193	9.973454	10.026546	10.137647	9.862353	45	60
1	15	9.835840	10.164160	9.973517	10.026483	10.137677	9.862323	45	59
2	30	9.835874	10.164126	9.973580	10.026420	10.137707	9.862293	30	58
3	45	9.835907	10.164093	9.973644	10.026356	10.137737	9.862263	15	57
4	16	9.835941	10.164059	9.973707	10.026293	10.137766	9.862234	44	56
5	15	9.835974	10.164026	9.973770	10.026230	10.137796	9.862204	45	55
6	30	9.836008	10.163992	9.973834	10.026166	10.137826	9.862174	30	54
7	45	9.836041	10.163959	9.973897	10.026103	10.137855	9.862145	15	53
8	17	9.836075	10.163925	9.973960	10.026040	10.137885	9.862115	43	52
9	15	9.836108	10.163892	9.974023	10.025977	10.137915	9 862085	45	51
10	30	9 836142	10.163858	9.974087	10.025913	10.137945	9.862055	30	50
11	45	9.836176	10.163824	9.974150	10.025850	10.137974	9.862026	15	49
12	18	9.836209	10.163791	9.974213	10.025787	10.138004	9.861996	42	48
13	15	9.836243	10.163757	9.974277	10.025723	10.138034	9.861966	45	47
14	30	9.836276	10.163724	9.974340	10.025660	10.138064	9.861936	30	46
15	45	9.836310	10.163690	9.974403	10.025597	10.138094	9.861906	15	45
16	19	9.836343	10.163657	9.974466	10.025534	10.138123	9.861877	41	44
17	15	9.836377	10.163623	9.974530	10.025470	10.138153	9.861847	45	43
18	30	9.836410	10.163590	9.974593	10.025407	10.138183	9.861817	30	42
19	45	9.836444	10.163556	9.974656	10.025344	10.138213	9.861787	15	41
20	20	9.836477	10.163523	9.974719	10.025281	10.138242	9.861758	40	40
21	15	9.836510	10.163490	9.974783	10.025217	10.138272	9.861728	45	39
22	30	9 836544	10.163456	9.974846	10.025154	10.138302	9.861698	30	38
23	45	9.836577	10.163423	9.974909	10.025091	10.138332	9.861668	15	37
24	21	9.836611	10.163389	9.974973	10.025027	10.138362	9.861638	39	36
25	15	9.836644	10.163356	9.975036	10.024964	10.138392	9.861608	45	35
26	30	9.836678	10.163322	9.975099	10.024901	10.138421	9.861579	30	34
27	45	9 836711	10.163289	9.975162	10.024838	10.138451	9.861549	15	33
28	22	9 836745	10.163255	9.975226	10.024774	10.138481	9.861519	38	32
29	15	9.836778	10.163222	9.975289	10.024711	10.138511	9.861489	45	31
30	30	9.836812	10.163188	9.975352	10.024648	10.138541	9.861459	30	30
31	45	9.836845	10.163155	9.975415	10.024585	10.138571	9.861429	15	29
32	23	9.836878	10.163122	9.975479	10.024521	10.138600	9.861400	37	28
33	15	9.836912	10.163088	9.975542	10.024458	10.138630	9.861370	45	27
34	30	9.836945	10.163055	9.975605	10.024395	10.138660	9.861340	30	26
35	45	9.836979	10.163021	9.975668	10.024332	10.138690	9.861310	15	25
36	24	9.837012	10.162988	9.975732	10.024268	10.138720	9.861280	36	24
37	15	9.837045	10.162955	9.975795	10.024205	10.138750	9.861250	45	23
38	30	9.837079	10.162921	9.975858	10.024142	10.138780	9.861220	30	22
39	45	9.837112	10.162888	9.975922	10.024078	10.138809	9.861191	15	21
40	25	9.837146	10.162854	9.975985	10.024015	10 138839	9.861161	35	20
41	15	9.837179	10.162821	9.976048	10.023952	10.138869	9.861131	45	19
42	30	9.837212	10.162788	9.976111	10.023889	10.138899	9.861101	30	18
43	45	9.837246	10.162754	9.976175	10.023825	10.138929	9.861071	15	17
44	26	9.837279	10.162721	9.976238	10.023762	10.138959	9.861041	34	16
45	15	9.837312	10.162688	9.976301	10.023699	10.138989	9.861011	45	15
46	30	9.837346	10.162654	9.976364	10.023636	10 139019	9.860981	30	14
47	45	9.837379	10.162621	9.976428	10.023572	10 139049	9.860951	15	13
48	27	9.837412	10.162588	9.976491	10.023509	10.139079	9.860921	33	12
49	15	9.837446	10.162554	9.976554	10.023446	10 139108	9.860892	45	11
50	30	9.837479	10.162521	9.976617	10.023383	10 139138	9 860862	30	10
51	45	9.837512	10.162488	9.976681	10.023319	10.139168	9.860832	15	9
52	28	9.837546	10.162454	9.976744	10.023256	10.139198	9.860802	32	8
53	15	9.837579	10.162421	9.976807	10.023193	10.139228	9.860772	45	7
54	30	9.837612	10.162388	9.976870	10.023130	10.139258	9 860742	30	6
55	45	9.837646	10.162354	9.976934	10.023066	10.139288	9.860712	15	5
56	29	9.837679	10.162321	9.976997	10.023003	10.139318	9.860682	31	4
57	15	9.837712	10.162288	9.977060	10.022940	10.139348	9.860652	45	3
58	30	9.837746	10.162254	9.977123	10.022877	10.139378	9.860622	30	2
59	45	9.837779	10.162221	9.977187	10.022813	10.139408	9.860592	15	1
60	30	9.837812	10.162188	9.977250	10.022750	10.139438	9.860562	30	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	3h 6m.		LOG. SINES, &c.				46 deg.		

2h 54m.				LOG. SINES, &c.			43 deg.		
sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	30	9.837812	10.162188	9.977250	10.022750	10.139438	9.860562	30	60
1	15	9.837845	10.162155	9.977313	10.022687	10.139468	9.860532	45	59
2	30	9.837879	10.162121	9.977376	10.022624	10.139498	9.860502	30	58
3	45	9.837912	10.162088	9.977440	10.022560	10.139528	9.860472	15	57
4	31	9.837945	10.162055	9.977503	10.022497	10.139558	9.860442	29	56
5	15	9.837978	10.162022	9.977566	10.022434	10.139588	9.860412	45	55
6	30	9.838012	10.161988	9.977629	10.022371	10.139618	9.860382	30	54
7	45	9.838045	10.161955	9.977693	10.022307	10.139648	9.860352	15	53
8	32	9.838078	10.161922	9.977756	10.022244	10.139678	9.860322	28	52
9	15	9.838111	10.161889	9.977819	10.022181	10.139708	9.860292	45	51
10	30	9.838145	10.161855	9.977882	10.022118	10.139738	9.860262	30	50
11	45	9.838178	10.161822	9.977946	10.022054	10.139768	9.860232	15	49
12	33	9.838211	10.161789	9.978009	10.021991	10.139798	9.860202	27	48
13	15	9.838244	10.161756	9.978072	10.021928	10.139828	9.860172	45	47
14	30	9.838278	10.161722	9.978135	10.021865	10.139858	9.860142	30	46
15	45	9.838311	10.161689	9.978199	10.021801	10.139888	9.860112	15	45
16	34	9.838344	10.161656	9.978262	10.021738	10.139918	9.860082	26	44
17	15	9.838377	10.161623	9.978325	10.021675	10.139948	9.860052	45	43
18	30	9.838410	10.161590	9.978388	10.021612	10.139978	9.860022	30	42
19	45	9.838444	10.161556	9.978452	10.021548	10.140008	9.859992	15	41
20	35	9.838477	10.161523	9.978515	10.021485	10.140038	9.859962	25	40
21	15	9.838510	10.161490	9.978578	10.021422	10.140068	9.859932	45	39
22	30	9.838543	10.161457	9.978641	10.021359	10.140098	9.859902	30	38
23	45	9.838576	10.161424	9.978705	10.021295	10.140128	9.859872	15	37
24	36	9.838610	10.161390	9.978768	10.021232	10 140158	9.859842	24	36
25	15	9.838643	10.161357	9.978831	10.021169	10.140188	9.859812	45	35
26	30	9.838676	10.161324	9.978894	10.021106	10.140219	9.859781	30	34
27	45	9.838709	10.161291	9.978958	10.021042	10.140249	9.859751	15	33
28	37	9.838742	10.161258	9.979021	10.020979	10.140279	9.859721	23	32
29	15	9.838775	10.161225	9.979084	10.020916	10.140309	9.859691	45	31
30	30	9.838808	10.161192	9.979147	10.020853	10.140339	9.859661	30	30
31	45	9.838842	10.161158	9.979211	10.020789	10.140369	9.859631	15	29
32	38	9.838875	10.161125	9.979274	10.020726	10.140399	9.859601	22	28
33	15	9.838908	10.161092	9.979337	10.020663	10.140429	9.859571	45	27
34	30	9.838941	10.161059	9.979400	10.020600	10.140459	9.859541	30	26
35	45	9.838974	10.161026	9.979463	10.020537	10.140490	9.859510	15	25
36	39	9.839007	10.160993	9.979527	10.020473	10.140520	9.859480	21	24
37	15	9.839040	10.160960	9.979590	10 020410	10.140550	9 859450	45	23
38	30	9.839073	10.160927	9.979653	10.020347	10.140580	9.859420	30	22
39	45	9.839106	10.160894	9.979716	10.020284	10.140610	9.859390	15	21
40	40	9.839140	10.160860	9.979780	10.020220	10.140640	9.859360	20	20
41	15	9.839173	10.160827	9.979843	10.020157	10.140670	9.859330	45	19
42	30	9.839206	10.160794	9.979906	10.020094	10.140700	9.859300	30	18
43	45	9.839239	10.160761	9.979969	10.020031	10.140731	9.859269	15	17
44	41	9.839272	10.160728	9.980033	10.019967	10.140761	9.859239	19	16
45	15	9.839305	10.160695	9.980096	10.019904	10.140791	9.859209	45	15
46	30	9.839338	10.160662	9.980159	10.019841	10.140821	9.859179	30	14
47	45	9.839371	10.160629	9.980222	10.019778	10.140851	9.859149	15	13
48	42	9.839404	10.160596	9.980286	10.019714	10.140881	9.859119	18	12
49	15	9.839437	10.160563	9.980349	10.019651	10 140912	9.859088	45	11
50	30	9.839470	10.160530	9.980412	10.019588	10.140942	9.859058	30	10
51	45	9.839503	10.160497	9.980475	10.019525	10.140972	9.859028	15	9
52	43	9.839536	10.160464	9.980538	10.019462	10.141002	9.858998	17	8
53	15	9.839569	10.160431	9.980602	10.019398	10.141032	9.858968	45	7
54	30	9.839602	10.160398	9.980665	10.019335	10.141063	9.858937	30	6
55	45	9.839635	10.160365	9.980728	10.019272	10.141093	9.858907	15	5
56	44	9.839668	10.160332	9.980791	10.019209	10.141123	9.858877	16	4
57	15	9.839701	10.160299	9.980855	10.019145	10.141153	9.858847	45	3
58	30	9.839734	10.160266	9.980918	10.019082	10.141184	9.858816	30	2
59	45	9.839767	10.160233	9.980981	10.019019	10.141214	9.858786	15	1
60	45	9.839800	10.160200	9.981044	10.018956	10.141244	9.858756	15	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
3h 5m.				LOG. SINES, &c.			46 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
2h 55m.			LOG. SINES, &c.				43 deg.		
0	45	9.839800	10.160200	9.981044	10.018956	10.141244	9.858756	15	60
1	15	9.839833	10.160167	9.981107	10.018893	10.141274	9.858726	45	59
2	30	9.839866	10.160134	9.981171	10.018829	10.141304	9.858696	30	58
3	45	9.839899	10.160101	9.981234	10.018766	10.141335	9.858665	15	57
4	46	9.839932	10.160068	9.981297	10.018703	10.141365	9.858635	14	56
5	15	9.839965	10.160035	9.981360	10.018640	10.141395	9.858605	45	55
6	30	9.839998	10.160002	9.981424	10.018576	10.141425	9.858575	30	54
7	45	9.840031	10.159969	9.981487	10.018513	10.141456	9.858544	15	53
8	47	9.840064	10.159936	9.981550	10.018450	10.141486	9.858514	13	52
9	15	9.840097	10.159903	9.981613	10.018387	10.141516	9.858484	45	51
10	30	9.840130	10.159870	9.981677	10.018323	10.141547	9.858453	30	50
11	45	9.840163	10.159837	9.981740	10.018260	10.141577	9.858423	15	49
12	48	9.840196	10.159804	9.981803	10.018197	10.141607	9.858393	12	48
13	15	9.840229	10.159771	9.981866	10.018134	10.141637	9.858363	45	47
14	30	9.840262	10.159738	9.981929	10.018071	10.141668	9.858332	30	46
15	45	9.840295	10.159705	9.981993	10.018007	10.141698	9.858302	15	45
16	49	9.840328	10.159672	9.982056	10.017944	10.141728	9.858272	11	44
17	15	9.840361	10.159639	9.982119	10.017881	10.141759	9.858241	45	43
18	30	9.840393	10.159607	9.982182	10.017818	10.141789	9.858211	30	42
19	45	9.840426	10.159574	9.982245	10.017755	10.141819	9.858181	15	41
20	50	9.840459	10.159541	9.982309	10.017691	10.141850	9.858150	10	40
21	15	9.840492	10.159508	9.982372	10.017628	10.141880	9.858120	45	39
22	30	9.840525	10.159475	9.982435	10.017565	10.141910	9.858090	30	38
23	45	9.840558	10.159442	9.982498	10.017502	10.141941	9.858059	15	37
24	51	9.840591	10.159409	9.982562	10.017438	10.141971	9.858029	9	36
25	15	9.840624	10.159376	9.982625	10.017375	10.142001	9.857999	45	35
26	30	9.840656	10.159344	9.982688	10.017312	10.142032	9.857968	30	34
27	45	9.840689	10.159311	9.982751	10.017249	10.142062	9.857932	15	33
28	52	9.840722	10.159278	9.982814	10.017186	10.142092	9.857908	8	32
29	15	9.840755	10.159245	9.982878	10.017122	10.142123	9.857877	45	31
30	30	9.840788	10.159212	9.982941	10.017059	10.142153	9.857847	30	30
31	45	9.840821	10.159179	9.983004	10.016996	10.142183	9.857817	15	29
32	53	9.840854	10.159146	9.983067	10.016933	10.142214	9.857786	7	28
33	15	9.840886	10.159114	9.983131	10.016869	10.142244	9.857756	45	27
34	30	9.840919	10.159081	9.983194	10.016806	10.142274	9.857726	30	26
35	45	9.840952	10.159048	9.983257	10.016743	10.142305	9.857695	15	25
36	54	9.840985	10.159015	9.983320	10.016680	10.142335	9.857665	6	24
37	15	9.841018	10.158982	9.983383	10.016617	10.142366	9.857634	45	23
38	30	9.841051	10.158949	9.983447	10.016553	10.142396	9.857604	30	22
39	45	9.841083	10.158917	9.983510	10.016490	10.142426	9.857574	15	21
40	55	9.841116	10.158884	9.983573	10.016427	10.142457	9.857543	5	20
41	15	9.841149	10.158851	9.983636	10.016364	10.142487	9.857513	45	19
42	30	9.841182	10.158818	9.983699	10.016301	10.142518	9.857482	30	18
43	45	9.841215	10.158785	9.983763	10.016237	10.142548	9.857452	15	17
44	56	9.841247	10.158753	9.983826	10.016174	10.142579	9.857421	4	16
45	15	9.841280	10.158720	9.983889	10.016111	10.142609	9.857391	45	15
46	30	9.841313	10.158687	9.983952	10.016048	10.142639	9.857361	30	14
47	45	9.841346	10.158654	9.984015	10.015985	10.142670	9.857330	15	13
48	57	9.841378	10.158622	9.984079	10.015921	10.142700	9.857300	3	12
49	15	9.841411	10.158589	9.984142	10.015858	10.142731	9.857269	45	11
50	30	9.841444	10.158556	9.984205	10.015795	10.142761	9.857239	30	10
51	45	9.841477	10.158523	9.984268	10.015732	10.142792	9.857208	15	9
52	58	9.841509	10.158491	9.984331	10.015669	10.142822	9.857178	2	8
53	15	9.841542	10.158458	9.984395	10.015605	10.142853	9.857147	45	7
54	30	9.841575	10.158425	9.984458	10.015542	10.142883	9.857117	30	6
55	45	9.841608	10.158392	9.984521	10.015479	10.142914	9.857086	15	5
56	59	9.841640	10.158360	9.984584	10.015416	10.142944	9 857056	1	4
57	15	9.841673	10.158327	9.984648	10.015352	10.142974	9.857026	45	3
58	30	9.841706	10.158294	9 984711	10.015289	10.143005	9.856995	30	2
59	45	9.841739	10.158261	9.984774	10.015226	10.143035	9.856965	15	1
60	60	9.841771	10.158229	9.984837	10.015163	10.143066	9.856934	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
3h 4m.			LOG. SINES, &c.				46 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
		$2^h\ 56^m$.	LOG. SINES, &c.				44 deg.		
0	0	9.841771	10.158229	9.984837	10.015163	10.143066	9.856934	60	60
1	15	9.841804	10.158196	9.984900	10.015100	10.143096	9.856904	45	59
2	30	9.841837	10.158163	9.984964	10.015036	10.143127	9.856873	30	58
3	45	9.841869	10.158131	9.985027	10.014973	10.143157	9.856843	15	57
4	1	9.841902	10.158098	9.985090	10.014910	10.143188	9.856812	59	56
5	15	9.841935	10.158065	9.985153	10.014847	10.143219	9.856781	45	55
6	30	9.841967	10.158033	9.985216	10.014784	10.143249	9.856751	30	54
7	45	9.842000	10.158000	9.985280	10.014720	10.143280	9.856720	15	53
8	2	9.842033	10.157967	9.985343	10.014657	10.143310	9.856690	58	52
9	15	9.842065	10.157935	9.985406	10.014594	10.143341	9.856659	45	51
10	30	9.842098	10.157902	9.985469	10.014531	10.143370	9.856630	30	50
11	45	9.842131	10.157869	9.985532	10.014468	10.143402	9.856598	15	49
12	3	9.842163	10.157837	9.985596	10.014404	10.143432	9.856568	57	48
13	15	9.842196	10.157804	9.985659	10.014341	10.143463	9.856537	45	47
14	30	9.842229	10.157771	9.985722	10.014278	10.143493	9.856507	30	46
15	45	9.842261	10.157739	9.985785	10.014215	10.143524	9.856476	15	45
16	4	9.842294	10.157706	9.985848	10.014152	10.143555	9.856445	56	44
17	15	9.842327	10.157673	9.985912	10.014088	10.143585	9.856415	45	43
18	30	9.842359	10.157641	9.985975	10.014025	10.143616	9.856384	30	42
19	45	9.842392	10.157608	9.986038	10.013962	10.143646	9.856354	15	41
20	5	9.842424	10.157576	9.986101	10.013899	10.143677	9.856323	55	40
21	15	9.842457	10.157543	9.986164	10.013836	10.143707	9.856293	45	39
22	30	9.842490	10.157510	9.986228	10.013772	10.143738	9.856262	30	38
23	45	9.842522	10.157478	9.986291	10.013709	10.143769	9.856231	15	37
24	6	9.842555	10.157445	9.986354	10.013646	10.143799	9.856201	54	36
25	15	9.842587	10.157413	9.986417	10.013583	10.143830	9.856170	45	35
26	30	9.842620	10.157380	9.986480	10.013520	10.143860	9.856140	30	34
27	45	9.842653	10.157347	9.986544	10.013456	10.143891	9.856109	15	33
28	7	9.842685	10.157315	9.986607	10.013393	10.143922	9.856078	53	32
29	15	9.842718	10.157282	9.986670	10.013330	10.143952	9.856048	45	31
30	30	9.842750	10.157250	9.986733	10.013267	10.143983	9.856017	30	30
31	45	9.842783	10.157217	9.986796	10.013204	10.144014	9.855986	15	29
32	8	9.842815	10.157185	9.986860	10.013140	10.144044	9.855956	52	28
33	15	9.842848	10.157152	9.986923	10.013077	10.144075	9.855925	45	27
34	30	9.842880	10.157120	9.986986	10.013014	10.144106	9.855894	30	26
35	45	9.842913	10.157087	9.987049	10.012951	10.144136	9.855864	15	25
36	9	9.842946	10.157054	9.987112	10.012888	10.144167	9.855833	51	24
37	15	9.842978	10.157022	9.987175	10.012825	10.144197	9.855803	45	23
38	30	9.843011	10.156989	9.987239	10.012761	10.144228	9.855772	30	22
39	45	9.843043	10.156957	9.987302	10.012698	10.144259	9.855741	15	21
40	10	9.843076	10.156924	9.987365	10.012635	10.144289	9.855711	50	20
41	15	9.843108	10.156892	9.987428	10.012572	10.144320	9.855680	45	19
42	30	9.843141	10.156859	9.987491	10.012509	10.144351	9.855649	30	18
43	45	9.843173	10.156827	9.987555	10.012445	10.144382	9.855618	15	17
44	11	9.843206	10.156794	9.987618	10.012382	10.144412	9.855588	49	16
45	15	9.843238	10.156762	9.987681	10.012319	10.144443	9.855557	45	15
46	30	9.843271	10.156729	9.987744	10.012256	10.144474	9.855526	30	14
47	45	9.843303	10.156697	9.987807	10.012193	10.144504	9.855496	15	13
48	12	9.843336	10.156664	9.987871	10.012129	10.144535	9.855465	48	12
49	15	9.843368	10.156632	9.987934	10.012066	10.144566	9.855434	45	11
50	30	9.843401	10.156599	9.987997	10.012003	10.144596	9.855404	30	10
51	45	9.843433	10.156567	9.988060	10.011940	10.144627	9.855373	15	9
52	13	9.843465	10.156535	9.988123	10.011877	10.144658	9.855342	47	8
53	15	9.843498	10.156502	9.988187	10.011813	10.144689	9.855311	45	7
54	30	9.843530	10.156470	9.988250	10.011750	10.144719	9.855281	30	6
55	45	9.843563	10.156437	9.988313	10.011687	10.144750	9.855250	15	5
56	14	9.843595	10.156405	9.988376	10.011624	10.144781	9.855219	46	4
57	15	9.843628	10.156372	9.988439	10.011561	10.144812	9.855188	45	3
58	30	9.843660	10.156340	9.988502	10.011498	10.144842	9.855158	30	2
59	45	9.843693	10.156307	9.988566	10.011434	10.144873	9.855127	15	1
60	15	9.843725	10.156275	9.988629	10.011371	10.144904	9.855096	45	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
		$3^h\ 3^m$.	LOG. SINES, &c.				45 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	$2^h\ 57^m$.		LOG. SINES, &C.				44 deg.		
0	15	9.843725	10.156275	9.988629	10.011371	10.144904	9.855096	45	60
1	15	9.843757	10.156243	9.988692	10.011308	10.144935	9.855065	45	59
2	30	9.843790	10.156210	9.988755	10.011245	10.144965	9.855035	30	58
3	45	9.843822	10.156178	9.988818	10.011182	10.144996	9.855004	15	57
4	16	9.843855	10.156145	9.988882	10.011118	10.145027	9.854973	44	56
5	15	9.843887	10.156113	9.988945	10.011055	10.145058	9.854942	45	55
6	30	9.843919	10.156081	9.989008	10.010992	10.145089	9.854911	30	54
7	45	9.843952	10.156048	9.989071	10.010929	10.145119	9.854881	15	53
8	17	9.843984	10.156016	9.989134	10.010866	10.145150	9.854850	43	52
9	15	9.844017	10.155983	9.989198	10.010802	10.145181	9.854819	45	51
10	30	9.844049	10.155951	9.989261	10.010739	10.145212	9.854788	30	50
11	45	9.844081	10.155919	9.989324	10.010676	10.145243	9.854757	15	49
12	18	9.844114	10.155886	9.989387	10.010613	10.145273	9.854727	42	48
13	15	9.844146	10.155854	9.989450	10.010550	10.145304	9.854696	45	47
14	30	9.844178	10.155822	9.989513	10.010487	10.145335	9.854665	30	46
15	45	9.844211	10.155789	9.989577	10.010423	10.145366	9.854634	15	45
16	19	9.844243	10.155757	9.989640	10.010360	10.145397	9.854603	41	44
17	15	9.844275	10.155725	9.989703	10.010297	10.145428	9.854572	45	43
18	30	9.844308	10.155692	9.989766	10.010234	10.145458	9.854542	30	42
19	45	9.844340	10.155660	9.989829	10.010171	10.145489	9.854511	15	41
20	20	9.844372	10.155628	9.989893	10.010107	10.145520	9.854480	40	40
21	15	9.844405	10.155595	9.989956	10.010044	10.145551	9.854449	45	39
22	30	9.844437	10.155563	9.990019	10.009981	10.145582	9.854418	30	38
23	45	9.844469	10.155531	9.990082	10.009918	10.145613	9.854387	15	37
24	21	9.844502	10.155498	9.990145	10.009855	10.145644	9.854356	39	36
25	15	9.844534	10.155466	9.990208	10.009792	10.145674	9.854326	45	35
26	30	9.844566	10.155434	9.990272	10.009728	10.145705	9.854295	30	34
27	45	9.844599	10.155401	9.990335	10.009665	10.145736	9.854264	15	33
28	22	9.844631	10.155369	9.990398	10.009602	10.145767	9.854233	38	32
29	15	9.844663	10.155337	9.990461	10.009539	10.145798	9.854202	45	31
30	30	9.844695	10.155305	9.990524	10.009476	10.145829	9.854171	30	30
31	45	9.844728	10.155272	9.990588	10.009412	10.145860	9.854140	15	29
32	23	9.844760	10.155240	9.990651	10.009349	10.145891	9.854109	37	28
33	15	9.844792	10.155208	9.990714	10.009286	10.145922	9.854078	45	27
34	30	9.844825	10.155175	9.990777	10.009223	10.145953	9.854047	30	26
35	45	9.844857	10.155143	9.990840	10.009160	10.145983	9.854017	15	25
36	24	9.844889	10.155111	9.990903	10.009097	10.146014	9.853986	36	24
37	15	9.844921	10.155079	9.990967	10.009033	10.146045	9.853955	45	23
38	30	9.844954	10.155046	9.991030	10.008970	10.146076	9.853924	30	22
39	45	9.844986	10.155014	9.991093	10.008907	10.146107	9.853893	15	21
40	25	9.845018	10 154982	9.991156	10.008844	10.146138	9.853862	35	20
41	15	9.845050	10.154950	9.991219	10.008781	10.146169	9.853831	45	19
42	30	9.845082	10.154918	9.991283	10.008717	10.146200	9.853800	30	18
43	45	9.845115	10.154885	9.991346	10.008654	10.146231	9.853769	15	17
44	26	9.845147	10.154853	9.991409	10.008591	10.146262	9.853738	34	16
45	15	9.845179	10.154821	9.991472	10.008528	10.146293	9.853707	45	15
46	30	9.845211	10.154789	9.991535	10.008465	10.146324	9.853676	30	14
47	• 45	9.845244	10.154756	9.991598	10.008402	10.146355	9.853645	15	13
48	27	9.845276	10.154724	9.991662	10.008338	10.146386	9.853614	33	12
49	15	9.845308	10.154692	9.991725	10.008275	10.146417	9.853583	45	11
50	30	9.845340	10.154660	9.991788	10.008212	10.146448	9.853552	30	10
51	45	9.845372	10.154628	9.991851	10.008149	10.146479	9.853521	15	9
52	28	9.845404	10.154596	9.991914	10.008086	10.146510	9.853490	32	8
53	15	9.845437	10.154563	9.991977	10.008023	10.146541	9.853459	45	7
54	30	9.845469	10.154531	9.992041	10.007959	10.146572	9.853428	30	6
55	45	9.845501	10.154499	9.992104	10.007896	10.146603	9.853397	15	5
56	29	9.845533	10.154467	9.992167	10.007833	10.146634	9.853366	31	4
57	15	9.845565	10.154435	9.992230	10.007770	10.146665	9.853335	45	3
58	30	9.845597	10.154403	9.992293	10.007707	10.146696	9.853304	30	2
59	45	9.845630	10.154370	9.992357	10.007643	10.146727	9.853273	15	1
60	30	9.845662	10.154338	9.992420	10.007580	10.146758	9.853242	30	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	$3^h\ 2^m$.		LOG. SINES, &c.				45 deg.		

sec.	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
	2h 58m.		LOG. SINES, &c.				44 deg.		
0	30	9.845662	10.154338	9.992420	10.007580	10.146758	9.853242	30	60
1	15	9.845694	10.154306	9.992483	10.007517	10.146789	9.853211	45	59
2	30	9.845726	10.154274	9.992546	10.007454	10.146820	9.853180	30	58
3	45	9.845758	10.154242	9.992609	10.007391	10.146851	9.853149	15	57
4	31	9.845790	10.154210	9.992672	10.007328	10.146882	9.853118	29	56
5	15	9.845822	10.154178	9.992736	10.007264	10.146913	9.853087	45	55
6	30	9.845854	10.154146	9.992799	10.007201	10.146944	9.853056	30	54
7	45	9.845887	10.154113	9.992862	10.007138	10.146975	9.853025	15	53
8	32	9.845919	10.154081	9.992925	10.007075	10.147006	9.852994	28	52
9	15	9.845951	10.154049	9.992988	10.007012	10.147038	9.852962	45	51
10	30	9.845983	10.154017	9.993051	10.006949	10.147069	9.852931	30	50
11	45	9.846015	10.153985	9.993115	10.006885	10.147100	9.852900	15	49
12	33	9.846047	10.153953	9.993178	10.006822	10.147131	9.852869	27	48
13	15	9.846079	10.153921	9.993241	10.006759	10.147162	9.852838	45	47
14	30	9.846111	10.153889	9.993304	10.006696	10.147193	9.852807	30	46
15	45	9.846143	10.153857	9.993367	10.006633	10.147224	9.852776	15	45
16	34	9.846175	10.153825	9.993430	10.006570	10.147255	9.852745	26	44
17	15	9.846207	10.153793	9.993494	10.006506	10.147286	9.852714	45	43
18	30	9.846239	10.153761	9.993557	10.006443	10.147317	9.852683	30	42
19	45	9.846272	10.153728	9.993620	10.006380	10.147349	9.852651	15	41
20	35	9.846304	10.153696	9.993683	10.006317	10.147380	9.852620	25	40
21	15	9.846336	10.153664	9 993746	10.006254	10.147411	9.852589	45	39
22	30	9.846368	10.153632	9.993810	10.006190	10.147442	9.852558	30	38
23	45	9.846400	10.153600	9.993873	10.006127	10.147473	9.852527	15	37
24	36	9.846432	10.153568	9.993936	10.006064	10.147504	9.852496	24	36
25	15	9.846464	10.153536	9.993999	10.006001	10.147535	9.852465	45	35
26	30	9.846496	10.153504	9.994062	10.005938	10.147566	9.852434	30	34
27	45	9.846528	10.153472	9.994125	10.005875	10.147598	9.852402	15	33
28	37	9.846560	10.153440	9.994189	10.005811	10.147629	9.852371	23	32
29	15	9.846592	10.153408	9.994252	10.005748	10.147660	9.852340	45	31
30	30	9.846624	10.153376	9.994315	10.005685	10.147691	9.852309	30	30
31	45	9.846656	10.153344	9.994378	10.005622	10.147722	9.852278	15	29
32	38	9.846688	10.153312	9.994441	10.005559	10.147753	9.852247	22	28
33	15	9.846720	10.153280	9.994504	10.005496	10.147785	9.852215	45	27
34	30	9.846752	10.153248	9.994568	10.005432	10.147816	9.852184	30	26
35	45	9.846784	10.153216	9.994631	10.005369	10.147847	9.852153	15	25
36	39	9.846816	10.153184	9.994694	10.005306	10.147878	9.852122	21	24
37	15	9.846848	10.153152	9.994757	10.005243	10.147909	9.852091	45	23
38	30	9.846880	10.153120	9.994820	10.005180	10.147941	9.852059	30	22
39	45	9.846912	10.153088	9.994883	10.005117	10.147972	9.852028	15	21
40	40	9.846944	10.153056	9.994947	10.005053	10.148003	9.851997	20	20
41	15	9.846976	10.153024	9.995010	10.004990	10.148034	9.851966	45	19
42	30	9.847007	10.152993	9.995073	10.004927	10.148066	9.851934	30	18
43	45	9.847039	10.152961	9.995136	10.004864	10.148097	9.851903	15	17
44	41	9.847071	10.152929	9.995199	10.004801	10.148128	9.851872	19	16
45	15	9.847103	10.152897	9.995262	10.004738	10.148159	9.851841	45	15
46	30	9.847135	10.152865	9.995326	10.004674	10.148190	9.851810	30	14
47	45	9.847167	10.152833	9.995389	10.004611	10.148222	9.851778	15	13
48	42	9.847199	10.152801	9.995452	10.004548	10.148253	9.851747	18	12
49	15	9.847231	10.152769	9.995515	10.004485	10.148284	9.851716	45	11
50	30	9.847263	10.152737	9.995578	10.004422	10.148315	9.851685	30	10
51	45	9.847295	10.152705	9.995641	10.004359	10.148347	9 851653	15	9
52	43	9.847327	10.152673	9.995705	10.004295	10.148378	9.851622	17	8
53	15	9.847359	10.152641	9.995768	10.004232	10.148409	9.851591	45	7
54	30	9.847390	10.152610	9.995831	10.004169	10.148441	9.851559	30	6
55	45	9.847422	10.152578	9.995894	10.004106	10.148472	9.851528	15	5
56	44	9.847454	10.152546	9.995957	10.004043	10.148503	9.851497	16	4
57	15	9.847486	10.152514	9.996020	10.003980	10.148534	9.851466	45	3
58	30	9.847518	10.152482	9.996084	10.003916	10.148566	9.851434	30	2
59	45	9.847550	10.152450	9.996147	10.003853	10.148597	9.851403	15	1
60	45	9.847582	10.152418	9.996210	10.003790	10.148628	9.851372	15	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
	3h 1m.		LOG. SINES, &c.				45 deg.		

2h 59m.			LOG. SINES, &c.				44 deg.		
sec	′ ″	sine.	cosecant.	tangent.	cotangent.	secant.	cosine.	″ ′	sec.
0	45	9.847582	10.152418	9.996210	10.003790	10.148628	9.851372	15	60
1	15	9.847614	10.152386	9.996273	10.003727	10.148660	9.851340	45	59
2	30	9.847645	10.152355	9.996336	10.003664	10.148691	9.851309	30	58
3	45	9.847677	10.152323	9.996399	10.003601	10.148722	9.851278	15	57
4	46	9.847709	10.152291	9.996463	10.003537	10.148754	9.851246	14	56
5	15	9.847741	10.152259	9.996526	10.003474	10.148785	9.851215	45	55
6	30	9.847773	10.152227	9.996589	10.003411	10.148816	9.851184	30	54
7	45	9.847805	10.152195	9.996652	10.003348	10.148848	9.851152	15	53
8	47	9.847836	10.152164	9.996715	10.003285	10.148879	9.851121	13	52
9	15	9.847868	10.152132	9.996778	10.003222	10.148910	9.851090	45	51
10	30	9.847900	10.152100	9.996842	10.003158	10.148942	9.851058	30	50
11	45	9.847932	10.152068	9.996905	10.003095	10.148973	9.851027	15	49
12	48	9.847964	10.152036	9.996968	10.003032	10.149004	9.850996	12	48
13	15	9.847995	10.152005	9.997031	10.002969	10.149036	9.850964	45	47
14	30	9.848027	10.151973	9.997094	10.002906	10.149067	9.850933	30	46
15	45	9.848059	10.151941	9.997157	10.002843	10.149098	9.850902	15	45
16	49	9.848091	10.151909	9.997221	10.002779	10.149130	9.850870	11	44
17	15	9.848123	10.151877	9.997284	10.002716	10.149161	9.850839	45	43
18	30	9.848154	10.151846	9.997347	10.002653	10.149193	9.850807	30	42
19	45	9.848186	10.151814	9.997410	10.002590	10.149224	9.850776	15	41
20	50	9 848218	10.151782	9.997473	10.002527	10.149255	9.850745	10	40
21	15	9.848250	10.151750	9.997536	10.002464	10.149287	9.850713	45	39
22	30	9.848281	10.151719	9.997600	10.002400	10.149318	9.850682	30	38
23	45	9.848313	10.151687	9.997663	10.002337	10.149350	9.850650	15	37
24	51	9.848345	10.151655	9.997726	10.002274	10.149381	9.850619	9	36
25	15	9.848377	10.151623	9.997789	10.002211	10.149412	9.850588	45	35
26	30	9.848408	10.151592	9.997852	10.002148	10.149444	9.850556	30	34
27	45	9.848440	10.151560	9.997915	10.002085	10.149475	9.850525	15	33
28	52	9.848472	10.151528	9.997979	10.002021	10.149507	9.850493	8	32
29	15	9.848504	10.151496	9.998042	10.001958	10.149538	9.850462	45	31
30	30	9.848535	10.151465	9.998105	10.001895	10.149570	9.850430	30	30
31	45	9.848567	10.151433	9.998168	10.001832	10.149601	9.850399	15	29
32	53	9.848599	10.151401	9.998231	10.001769	10.149633	9.850367	7	28
33	15	9.848631	10.151369	9.998294	10.001706	10.149664	9.850336	45	27
34	30	9.848662	10.151338	9.998358	10.001642	10.149695	9.850305	30	26
35	45	9.848694	10.151306	9.998421	10.001579	10.149727	9.850273	15	25
36	54	9.848726	10.151274	9.998484	10.001516	10.149758	9.850242	6	24
37	15	9.848757	10.151243	9.998547	10.001453	10.149790	9.850210	45	23
38	30	9.848789	10.151211	9.998610	10.001390	10.149821	9.850179	30	22
39	45	9.848821	10.151179	9.998673	10.001327	10.149853	9.850147	15	21
40	55	9.848852	10.151148	9.998737	10.001263	10.149884	9.850116	5	20
41	15	9.848884	10.151116	9.998800	10.001200	10.149916	9.850084	45	19
42	30	9.848916	10.151084	9.998863	10.001137	10 149947	9.850053	30	18
43	45	9.848947	10.151053	9.998926	10.001074	10.149979	9.850021	15	17
44	56	9.848979	10.151021	9.998989	10.001011	10.150010	9.849990	4	16
45	15	9.849011	10.150989	9.999052	10.000948	10.150042	9.849958	45	15
46	30	9.849042	10.150958	9.999116	10.000884	10.150073	9.849927	30	14
47	45	9.849074	10.150926	9.999179	10.000821	10.150105	9.849895	15	13
48	57	9.849106	10.150894	9.999242	10.000758	10.150136	9.849864	3	12
49	15	9.849137	10.150863	9.999305	10.000695	10.150168	9.849832	45	11
50	30	9.849169	10.150831	9.999368	10.000632	10.150199	9.849801	30	10
51	45	9.849201	10.150799	9.999431	10.000569	10.150231	9.849769	15	9
52	58	9.849232	10.150768	9.999495	10.000505	10.150263	9.849737	2	8
53	15	9.849264	10.150736	9.999558	10.000442	10.150294	9.849706	45	7
54	30	9.849295	10.150705	9.999621	10.000379	10.150326	9.849674	30	6
55	45	9.849327	10.150673	9.999684	10.000316	10.150357	9.849643	15	5
56	59	9.849359	10.150641	9.999747	10.000253	10.150389	9.849611	1	4
57	15	9.849390	10.150610	9.999810	10.000190	10.150420	9.849580	45	3
58	30	9 849422	10.150578	9.999874	10.000126	10.150452	9.849548	30	2
59	45	9.849453	10.150547	9.999937	10.000063	10.150483	9.849517	15	1
60	60	9.849485	10.150515	10.000000	10.000000	10.150515	9.849485	0	0
sec.	′ ″	cosine.	secant.	cotangent.	tangent.	cosecant.	sine.	″ ′	sec.
3h 0m.			LOG. SINES, &c.				45 deg.		

PROPORTIONAL PARTS.

☞ Consider as many right hand figures decimal fractions as case requires, and the same number of decimal fractions in Nr. taken out as in Nr. entered with.

15	14	13	*12*	11	10	9	8	7	6	5	4	3	2	1	½	* 12
60	56	52	48	44	40	36	32	28	24	20	16	12	8	4	1	for min.
1250	1167	1083	1000	917	833	750	667	583	500	417	333	250	167	83	21	15000
1300	1213	1127	1040	953	867	780	693	607	520	433	347	260	173	87	22	15600
1350	1260	1170	1080	990	900	810	720	630	540	450	360	270	180	90	23	16200
1400	1307	1213	1120	1027	933	840	747	653	560	467	373	280	187	93	23	16800
1450	1353	1257	1160	1063	967	870	773	677	580	483	387	290	193	97	24	17400
1500	1400	1300	1200	1100	1000	900	800	700	600	500	400	300	200	100	25	18000
1550	1447	1343	1240	1137	1033	930	827	723	620	517	413	310	207	103	26	18600
1600	1493	1387	1280	1173	1067	960	853	747	640	533	427	320	213	107	27	19200
1650	1540	1430	1320	1210	1100	990	880	770	660	550	440	330	220	110	27	19800
1700	1587	1473	1360	1247	1133	1020	907	793	680	567	453	340	227	113	28	20400
1750	1633	1517	1400	1283	1167	1050	933	817	700	583	467	350	233	117	29	21000
1800	1680	1560	1440	1320	1200	1080	960	840	720	600	480	360	240	120	30	21600
1850	1727	1603	1480	1357	1233	1110	987	863	740	617	493	370	247	123	31	22200
1900	1773	1647	1520	1393	1267	1140	1013	887	760	633	507	380	253	127	32	22800
1950	1820	1690	1560	1430	1300	1170	1040	910	780	650	520	390	260	130	32	23400
2000	1867	1733	1600	1467	1333	1200	1067	933	800	667	533	400	267	133	33	24000
2050	1913	1777	1640	1503	1367	1230	1093	957	820	683	547	410	273	137	34	24600
2100	1960	1820	1680	1540	1400	1260	1120	980	840	700	560	420	280	140	35	25200
2150	2007	1863	1720	1577	1433	1290	1147	1003	860	717	573	430	287	143	36	25800
2200	2053	1907	1760	1613	1467	1320	1173	1027	880	733	587	440	293	147	37	26400
2250	2100	1950	1800	1650	1500	1350	1200	1050	900	750	600	450	300	150	37	27000
2300	2147	1993	1840	1687	1533	1380	1227	1073	920	767	613	460	307	153	38	27600
2350	2193	2037	1880	1723	1567	1410	1253	1097	940	783	627	470	313	157	39	28200
2400	2240	2080	1920	1760	1600	1440	1280	1120	960	800	640	480	320	160	40	28800
2450	2287	2123	1960	1797	1633	1470	1307	1143	980	817	653	490	327	163	41	29400
2500	2333	2167	2000	1833	1667	1500	1333	1167	1000	833	667	500	333	167	42	30000
2550	2380	2210	2040	1870	1700	1530	1360	1190	1020	850	680	510	340	170	42	30600
2600	2427	2253	2080	1907	1733	1560	1387	1213	1040	867	693	520	347	173	43	31200
2650	2473	2297	2120	1943	1767	1590	1413	1237	1060	883	707	530	353	177	44	31800
2700	2520	2340	2160	1980	1800	1620	1440	1260	1080	900	720	540	360	180	45	32400
2750	2567	2383	2200	2017	1833	1650	1467	1283	1100	917	733	550	367	183	46	33000
2800	2613	2427	2240	2053	1867	1680	1493	1307	1120	933	747	560	373	187	47	33600
2850	2660	2470	2280	2090	1900	1710	1520	1330	1140	950	760	570	380	190	47	34200
2900	2707	2513	2320	2127	1933	1740	1547	1353	1160	967	773	580	387	193	48	34800
2950	2753	2557	2360	2163	1967	1770	1573	1377	1180	983	787	590	393	197	49	35400
3000	2800	2600	2400	2200	2000	1800	1600	1400	1200	1000	800	600	400	200	50	36000
3050	2847	2643	2440	2237	2033	1830	1627	1423	1220	1017	813	610	407	203	51	36600
3100	2893	2687	2480	2273	2067	1860	1653	1447	1240	1033	827	620	413	207	52	37200
3150	2940	2730	2520	2310	2100	1890	1680	1470	1260	1050	840	630	420	210	52	37800
3200	2987	2773	2560	2347	2133	1920	1707	1493	1280	1067	853	640	427	213	53	38400
3250	3033	2817	2600	2383	2167	1950	1733	1517	1300	1083	867	650	433	217	54	39000
3300	3080	2860	2640	2420	2200	1980	1760	1540	1320	1100	880	660	440	220	55	39600
3350	3127	2903	2680	2457	2233	2010	1787	1563	1340	1117	893	670	447	223	56	40200
3400	3173	2947	2720	2493	2267	2040	1813	1587	1360	1133	907	680	453	227	57	40800
3450	3220	2990	2760	2530	2300	2070	1840	1610	1380	1150	920	690	460	230	57	41400
3500	3267	3033	2800	2567	2333	2100	1867	1633	1400	1167	933	700	467	233	58	42000
3750	3500	3250	3000	2750	2500	2250	2000	1750	1500	1250	1000	750	500	250	62	45000
4000	3733	3467	3200	2933	2667	2400	2133	1867	1600	1333	1067	800	533	267	67	48000
4250	3967	3683	3400	3117	2833	2550	2267	1983	1700	1417	1133	850	567	283	71	51000
4500	4200	3900	3600	3300	3000	2700	2400	2100	1800	1500	1200	900	600	300	75	54000
4750	4433	4117	3800	3483	3167	2850	2533	2217	1900	1583	1267	950	633	317	79	57000
5000	4667	4333	4000	3667	3333	3000	2667	2333	2000	1667	1333	1000	667	333	83	60000
5250	4900	4550	4200	3850	3500	3150	2800	2450	2100	1750	1400	1050	700	350	87	63000
5500	5133	4767	4400	4033	3667	3300	2933	2567	2200	1833	1467	1100	733	367	92	66000
5750	5367	4983	4600	4217	3833	3450	3067	2683	2300	1917	1533	1150	767	383	96	69000
6000	5600	5200	4800	4400	4000	3600	3200	2800	2400	2000	1600	1200	800	400	100	72000
6250	5833	5417	5000	4583	4167	3750	3333	2917	2500	2083	1667	1250	833	417	104	75000
6500	6067	5633	5200	4767	4333	3900	3467	3033	2600	2167	1733	1300	867	433	108	78000
6750	6300	5850	5400	4950	4500	4050	3600	3150	2700	2250	1800	1350	900	450	112	81000
7000	6533	6067	5600	5133	4667	4200	3733	3267	2800	2333	1867	1400	933	467	117	84000
7250	6767	6283	5800	5317	4833	4350	3867	3383	2900	2417	1933	1450	967	483	121	87000
7500	7000	6500	6000	5500	5000	4500	4000	3500	3000	2500	2000	1500	1000	500	125	90000
7750	7233	6717	6200	5683	5167	4650	4133	3617	3100	2583	2067	1550	1033	517	129	93000
8000	7467	6933	6400	5867	5333	4800	4267	3733	3200	2667	2133	1600	1067	533	133	96000
8250	7700	7150	6600	6050	5500	4950	4400	3850	3300	2750	2200	1650	1100	550	137	99000
8500	7933	7367	6800	6233	5667	5100	4533	3967	3400	2833	2267	1700	1133	567	142	102000
8750	8167	7583	7000	6417	5833	5250	4667	4083	3500	2917	2333	1750	1167	583	146	105000
9000	8400	7800	7200	6600	6000	5400	4800	4200	3600	3000	2400	1800	1200	600	150	108000
9250	8633	8017	7400	6783	6167	5550	4933	4317	3700	3083	2467	1850	1233	617	154	111000
9500	8867	8233	7600	6967	6333	5700	5067	4433	3800	3167	2533	1900	1267	633	158	114000
9750	9100	8450	7800	7150	6500	5850	5200	4550	3900	3250	2600	1950	1300	650	162	117000
10000	9333	8667	8000	7333	6667	6000	5333	4667	4000	3333	2667	2000	1333	667	167	120000
10250	9567	8883	8200	7517	6833	6150	5467	4783	4100	3417	2733	2050	1367	683	171	123000
10500	9800	9100	8400	7700	7000	6300	5600	4900	4200	3500	2800	2100	1400	700	175	126000
10750	10033	9317	8600	7883	7167	6450	5733	5017	4300	3583	2867	2150	1433	717	179	129000
11000	10267	9533	8800	8067	7333	6600	5867	5133	4400	3667	2933	2200	1467	733	183	132000
11250	10500	9750	9000	8250	7500	6750	6000	5250	4500	3750	3000	2250	1500	750	187	135000
11500	10733	9967	9200	8433	7667	6900	6133	5367	4600	3833	3067	2300	1533	767	192	138000
11750	10967	10183	9400	8617	7833	7050	6267	5483	4700	3917	3133	2350	1567	783	196	141000
12000	11200	10400	9600	8800	8000	7200	6400	5600	4800	4000	3200	2400	1600	800	200	144000
12250	11433	10617	9800	8983	8167	7350	6533	5717	4900	4083	3267	2450	1633	817	204	147000
12500	11667	10833	10000	9167	8333	7500	6667	5833	5000	4167	3333	2500	1667	833	208	150000

0 Hours. ½ Log. Haversines. 0 Hours.

sec.	0m	1m	2m	3m	4m	5m	6m	7m	8m	9m	sec.
	0 deg.				1 deg.				2 deg.		
	′ 0′	15′	30′	45′	0′	15′	30′	45′	0′	15′	
0	0 0.000000	2.338787	2.639816	2.815905	2.940842	3.037749	3.116926	3.183868	3.241855	3.293002	60
1	15 0.560637	345965	643420	818311	942647	039194	118131	184901	242759	293805	59
2	30 0.861666	353027	646994	820704	944446	040634	119332	185931	243661	294607	58
3	45 1.037758	359976	650539	823084	946236	042070	120530	186959	244561	295407	57
	1′	16′	31′	46′	1′	16′	31′	46′	1	16′	
4	0 1.162696	2.366815	2.654056	2.825450	2.948020	3.043501	3.121725	3.187985	3.245459	3.296206	56
5	15 259606	373549	657544	827804	949796	044927	122916	189008	246355	297004	55
6	30 338787	380179	661005	830146	951565	046348	124104	190028	247250	297800	54
7	45 405735	386710	664438	832474	953327	047765	125289	191046	248142	298595	53
	2′	17′	32′	47′	2′	17′	32′	47′	2	17′	
8	0 1.463726	2.393144	2.667844	2.834790	2.955082	3.049178	3.126471	3.192062	3.249033	3.299388	52
9	15 514879	399484	671224	837094	956829	050585	127649	193076	249922	300179	51
10	30 560636	405733	674578	839386	958570	051988	128825	194087	250809	300970	50
11	45 602028	411894	677905	841666	960304	053387	129997	195095	251694	301758	49
	3	18′	33′	48′	3′	18′	33′	48′	3′	18′	
12	0 1.639817	2.417968	2.681208	2.843934	2.962030	3.054781	3.131166	3.196102	3.252578	3.302546	48
13	15 674579	423958	684486	846190	963750	056171	132331	197106	253460	303332	47
14	30 706764	429867	687739	848434	965463	057556	133494	198108	254339	304116	46
15	45 736727	435696	690968	850667	967170	058937	134654	199107	255218	304899	45
	4′	19′	34′	49′	4′	19′	34	49′	4′	19′	
16	0 1.764756	2.441449	2.694173	2.852888	2.968870	3.060313	3.135810	3.200104	3.256094	3.305681	44
17	15 791085	447126	697355	855098	970563	061685	136964	201099	256969	306461	43
18	30 815908	452730	700513	857297	972249	063053	138114	202092	257841	307240	42
19	45 839390	458262	703649	859485	973929	064417	139261	203082	258713	308018	41
	5′	20′	35′	50′	5′	20′	35′	50′	5′	20′	
20	0 1.861666	2.463725	2.706762	2.861662	2.975603	3.065776	3.140406	3.204070	3.259582	3.308794	40
21	15 882855	469120	709853	863828	977270	067131	141547	205056	260450	309569	39
22	30 903059	474449	712922	865983	978931	068482	142685	206039	261315	310342	38
23	45 922364	479713	715970	868128	980585	069828	143821	207021	262180	311114	37
	6′	21′	36′	51′	6′	21′	36′	51′	6′	21′	
24	0 1.940847	2.484914	2.718996	2.870262	2.982133	3.071171	3.144953	3.208000	3.263042	3.311885	36
25	15 958576	490054	722002	872386	983875	072509	146082	208977	263903	312654	35
26	30 975609	495134	724987	874499	985511	073843	147209	209952	264762	313422	34
27	45 992000	500154	727951	876602	987140	075173	148332	210924	265619	314188	33
	7′	22′	37′	52′	7	22′	37′	52′	7′	22	
28	0 2.007794	2.505118	2.730895	2.878695	2.988764	3.076499	3.149453	3.211895	3.266475	3.314953	32
29	15 023034	510025	733820	880778	990381	077821	150571	212863	267329	315717	31
30	30 037757	514878	736725	882851	991993	079139	151686	213829	268181	316480	30
31	45 051998	519676	739611	884914	993598	080453	152798	214793	269032	317241	29
	8′	23′	38′	53′	8′	23′	38′	53′	8′	23′	
32	0 2.065786	2.524423	2.742477	2.886967	2.995198	3.081763	3.153907	3.215755	3.269881	3.318001	28
33	15 079150	529118	745325	889011	996791	083069	155014	216714	270728	318759	27
34	30 092115	533763	748154	891045	998379	084372	156117	217672	271574	319516	26
35	45 104704	538358	750965	893070	999962	085670	157218	218627	272418	320272	25
	9′	24′	39′	54′	9′	24′	39′	54′	9	24′	
36	0 2.116938	2.542906	2.753758	2.895085	3.001538	3.086964	3.158316	3.219581	3.273261	3.321027	24
37	15 128837	547407	756533	897091	003108	088255	159411	220532	274101	321780	23
38	30 140419	551861	759291	899088	004673	089542	160504	221481	274940	322532	22
39	45 151700	556270	762031	901075	006233	090825	161593	222428	275777	323282	21
	10′	25′	40′	55′	10′	25′	40′	55′	10′	25′	
40	0 2.162696	2.560635	2.764753	2.903054	3.007786	3.092104	3.162681	3.223373	3.276613	3.324032	20
41	15 173420	564956	767459	905023	009335	093379	163765	224316	277448	324780	19
42	30 183885	569235	770148	906984	010877	094651	164846	225257	278280	325526	18
43	45 194104	573472	772821	908936	012415	095919	165925	226196	279111	326272	17
	11	26′	41′	56′	11′	26′	41′	56′	11	26′	
44	0 2.204088	2.577668	2.775477	2.910879	3.013947	3.097183	3.167002	3.227133	3.279941	3.327016	16
45	15 213848	581824	778117	912814	015473	098444	168075	228068	280769	327759	15
46	30 223394	585941	780741	914739	016994	099701	169146	229001	281595	328501	14
47	45 232733	590018	783350	916657	018510	100954	170214	229932	282420	329241	13
	12′	27′	42′	57′	12′	27′	42′	57′	12′	27′	
48	0 2.241877	2.594059	2.785942	2.918566	3.020020	3.102204	3.171280	3.230861	3.283243	3.329980	12
49	15 250832	598061	788520	920466	021526	103450	172343	231788	284065	330718	11
50	30 259606	602027	791082	922359	023026	104692	173404	232713	284885	331455	10
51	45 268206	605958	793629	924243	024521	105931	174461	233636	285703	332190	9
	13′	28′	43′	58′	13′	28′	43′	58′	13′	28′	
52	0 2.276639	2.609853	2.796161	2.926119	3.026011	3.107167	3.175517	3.234557	3.286520	3.332924	8
53	15 284911	613713	798679	927987	027495	108399	176570	235476	287336	333657	7
54	30 293029	617539	801182	929846	028975	109627	177620	236393	288150	334389	6
55	45 300998	621332	803671	931698	030450	110852	178667	237308	288962	335119	5
	14′	29	44′	59′	14′	29′	44′	59′	14′	29′	
56	0 2.308824	2.625093	2.806146	2.933543	3.031919	3.112074	3.179713	3.238221	3.289773	3.335848	4
57	15 316510	628820	808606	935379	033384	113292	180755	239132	290583	336576	3
58	30 324064	632517	811053	937207	034844	114507	181795	240042	291390	337303	2
59	45 331487	636181	813486	939028	036298	115718	182833	240949	292197	338028	1
60	2.338787	2.639816	2.815905	2.940842	3.037749	3.116926	3.183868	3.241855	3.293002	3.338753	0
sec.	59m	58m	57m	56m	55m	54m	53m	52m	51m	50	sec.

0 Hours. ½ Log. Haversines. 0 Hours.

sec.	10m	11m	12m	13m	14m	15m	16m	17m	18m	19m	sec.
	2 deg.		3 deg.				4 deg.				
	′ 30′	45′	0′	15′	30′	45′	0′	15′	30′	45′	
0	0 3.338753	3.380138	3.417919	3.452672	3.484848	3.514801	3.542819	3.569137	3.593948	3.617417	60
1	15 339476	380796	418521	453229	485364	515283	543271	569562	594350	617797	59
2	30 340198	381452	419123	453784	485880	515765	543723	569987	594751	618177	58
3	45 340918	382107	419724	454339	486395	516246	544173	570411	595152	618557	57
	31	46′	1′	16′	31′	46′	1′	16	31	46′	
4	0 3.341638	3.382762	3.420324	3.454893	3.486910	3.516726	3.544624	3.570836	3.595553	3.618937	56
5	15 342356	383415	420924	455447	487424	517206	545074	571259	595953	619316	55
6	30 343074	384068	421522	456000	487938	517686	545524	571683	596353	619695	54
7	45 343789	384719	422120	456551	488451	518164	545973	572105	596752	620073	53
	32′	47′	2′	17′	32′	47′	2′	17′	32′	47′	
8	0 3.344504	3.385370	3.422717	3.457103	3.488963	3.518643	3.546422	3.572528	3.597152	3.620452	52
9	15 345218	386019	423313	457653	489475	519121	546870	572950	597550	620830	51
10	30 345930	386668	423908	458203	489986	519598	547318	573372	597949	621207	50
11	45 346640	387315	424502	458752	490496	520075	547765	573793	598347	621584	49
	33	48′	3′	18′	33′	48′	3′	18′	33′	48′	
12	0 3.347352	3.387962	3.425096	3.459301	3.491006	3.520551	3.548212	3.574214	3.598745	3.621962	48
13	15 348060	388608	425688	459849	491515	521027	548658	574634	599142	622338	47
14	30 348768	389253	426281	460396	492024	521502	549104	575054	599539	622714	46
15	45 349475	389896	426871	460943	492532	521977	549550	575474	599935	623090	45
	34′	49′	4′	19′	34	49′	4′	19′	34′	49′	
16	0 3.350180	3.390539	3.427462	3.461489	3.493040	3.522451	3.549995	3.575893	3.600332	3.623466	44
17	15 350885	391181	428051	462033	493546	522925	550439	576312	600727	623841	43
18	30 351588	391822	428640	462578	494053	523398	550883	576730	601123	624216	42
19	45 352290	392462	429228	463122	494558	523871	551327	577148	601518	624591	41
	35′	50′	5′	20′	35′	50′	5′	20′	35′	50′	
20	0 3.352991	3.393101	3.429815	3.463665	3.495064	3.524343	3.551770	3.577566	3.601913	3.624965	40
21	15 353691	393739	430402	464207	495568	524814	552213	577983	602307	625339	39
22	30 354389	394376	430987	464749	496072	525286	552655	578400	602701	625713	38
23	45 355087	395012	431572	465290	496575	525756	553097	578816	603095	626086	37
	36′	51′	6′	21′	36′	51′	6′	21′	36′	51′	
24	0 3.355783	3.395647	3.432156	3.465830	3.497078	3.526226	3.553539	3.579232	3.603489	3.626459	36
25	15 356478	396282	432739	466370	497580	526696	553979	579648	603881	626832	35
26	30 357173	396915	433322	466909	498082	527165	554420	580063	604274	627205	34
27	45 357866	397547	433903	467447	498583	527633	554860	580478	604666	627576	33
	37′	52′	7′	22′	37′	52′	7′	22′	37′	52′	
28	0 3.358558	3.398179	3.434484	3.467985	3.499084	3.528102	3.555300	3.580892	3.605058	3.627948	32
29	15 359249	398810	435064	468522	499583	528569	555739	581306	605450	628320	31
30	30 359939	399440	435644	469058	500083	529036	556177	581720	605841	628691	30
31	45 360627	400068	436222	469594	500581	529503	556616	582133	606232	629062	29
	38′	53′	8′	23′	38′	53′	8′	23′	38	53′	
32	0 3.361315	3.400696	3.436800	3.470129	3.501080	3.529969	3.557054	3.582546	3.606623	3.629432	28
33	15 362001	401323	437377	470663	501577	530434	557491	582958	607012	629802	27
34	30 362687	401949	437953	471197	502074	530899	557928	583370	607403	630172	26
35	45 363371	402574	438528	471730	502571	531364	558364	583782	607792	630542	25
	39′	54′	9′	24′	39′	54′	9′	24′	39′	54′	
36	0 3.364054	3.403199	3.439103	3.472263	3.503067	3.531828	3.558800	3.584193	3.608181	3.630911	24
37	15 364736	403822	439677	472794	503562	532291	559236	584604	608570	631280	23
38	30 365418	404445	440250	473325	504057	532755	559671	585015	608958	631649	22
39	45 366098	405066	440822	473856	504551	533217	560106	585424	609346	632017	21
	40	55′	10′	25′	40′	55′	10′	25′	40′	55′	
40	0 3.366777	3.405687	3.441394	3.474386	3.505045	3.533679	3.560540	3.585834	3.609734	3.632385	20
41	15 367455	406307	441965	474914	505537	534141	560974	586244	610121	632752	19
42	30 368132	406926	442535	475443	506030	534602	561408	586653	610508	633120	18
43	45 368807	407544	443105	475971	506522	535062	561840	587061	610895	633487	17
	41′	56′	11′	26′	41′	56′	11′	26′	41′	56′	
44	0 3.369482	3.408161	3.443674	3.476498	3.507014	3.535523	3.562273	3.587469	3.611281	3.633854	16
45	15 370156	408777	444241	477025	507504	535982	562705	587877	611667	634220	15
46	30 370829	409393	444809	477551	507995	536442	563137	588285	612053	634586	14
47	45 371500	410007	445375	478076	508484	536900	563568	588691	612438	634952	13
	42′	57	12′	27′	42′	57′	12′	27′	42′	57′	
48	0 3.372171	3.410621	3.445941	3.478601	3.508974	3.537358	3.563999	3.589098	3.612823	3.635317	12
49	15 372840	411234	446506	479125	509462	537816	564430	589504	613208	635682	11
50	30 373509	411846	447070	479648	509950	538273	564860	589910	613592	636048	10
51	45 374176	412457	447633	480171	510438	538730	565289	590316	613976	636412	9
	43′	58′	13′	28′	43′	58′	13′	28′	43′	58′	
52	0 3.374843	3.413068	3.448196	3.480693	3.510925	3.539186	3.565719	3.590721	3.614360	3.636776	8
53	15 375508	413677	448758	481214	511411	539642	566147	591125	614743	637140	7
54	30 376173	414286	449320	481736	511897	540097	566576	591530	615126	637504	6
55	45 376836	414893	449880	482256	512382	540552	567003	591934	615508	637867	5
	44′	59′	14′	29′	44′	59′	14′	29′	44′	59′	
56	0 3.377499	3.415500	3.450440	3.482775	3.512867	3.541007	3.567431	3.592338	3.615891	3.638230	4
57	15 378160	416106	450999	483294	513351	541460	567858	592741	616273	638593	3
58	30 378821	416711	451558	483813	513835	541914	568285	593144	616654	638956	2
59	45 379480	417315	452115	484330	514318	542366	568711	593546	617035	639317	1
60	60 3.380138	3.417919	3.452672	3.484848	3.514801	3.542819	3.569137	3.593948	3.617417	3.639680	0
sec.	49m	48m	47m	46m	45m	44m	43m	42m	41m	40m	sec.

0 Hours. ½ Log. Haversines. 0 Hours.

sec.	20m	21m	22m	23m	24m	25m	26m	27m	28m	29m	sec.
	5 deg.				6 deg.				7 deg.		
	" 0'	15'	30'	45'	0'	15'	30'	45'	0'	15'	
0	0 3.639680	3.660855	3.681043	3.700333	3.718800	3.736512	3.753528	3.769900	3.785675	3.800896	60
1	15 640041	661199	681372	700647	719102	736801	753806	770167	785933	801145	59
2	30 640402	661543	681700	700961	719402	737090	754084	770435	786191	801394	58
3	45 640763	661887	682028	701275	719703	737379	754361	770702	786449	801642	57
	1'	16'	31'	46'	1'	16'	31'	46'	1'	16'	
4	0 3.641124	3.662230	3.682356	3.701589	3.720004	3.737667	3.754639	3.770970	3.786707	3.801891	56
5	15 641484	662573	682684	701902	720304	737956	754916	771237	786964	802140	55
6	30 641844	662916	683011	702215	720604	738244	755193	771504	787222	802389	54
7	45 642204	663259	683338	702528	720904	738532	755470	771770	787479	802637	53
	2'	17'	32'	47'	2'	17'	32'	47'	2'	17'	
8	0 3.642563	3.663601	3.683665	3.702841	3.721204	3.738820	3.755747	3.772037	3.787736	3.802885	52
9	15 642922	663943	683992	703153	721503	739107	756023	772303	787992	803133	51
10	30 643281	664285	684318	703466	721803	739395	756300	772569	788249	803381	50
11	45 643640	664627	684644	703778	722102	739682	756576	772835	788506	803629	49
	3'	18'	33'	48'	3'	18'	33'	48'	3'	18'	
12	0 3.643998	3.664968	3.684971	3.704090	3.722401	3.739969	3.756852	3.773101	3.788762	3.803876	48
13	15 644356	665309	685296	704401	722700	740256	757128	773367	789018	804124	47
14	30 644714	665650	685622	704713	722998	740543	757404	773633	789275	804371	46
15	45 645071	665990	685947	705024	723297	740829	757679	773898	789531	804618	45
	4'	19'	34'	49'	4'	19'	34'	49'	4'	19'	
16	0 3.645428	3.666331	3.686272	3.705335	3.723595	3.741115	3.757955	3.774163	3.789787	3.804865	44
17	15 645785	666671	686596	705645	723893	741401	758230	774428	790042	805112	43
18	30 646141	667011	686921	705956	724190	741687	758505	774693	790298	805359	42
19	45 646497	667350	687245	706266	724488	741973	758779	774958	790553	805606	41
	5'	20'	35'	50'	5'	20'	35'	50'	5'	20'	
20	0 3.646853	3.667689	3.687569	3.706577	3.724785	3.742259	3.759054	3.775223	3.790808	3.805852	40
21	15 647209	668028	687893	706886	725082	742544	759329	775487	791063	806098	39
22	30 647564	668367	688216	707196	725379	742829	759603	775751	791318	806345	38
23	45 647919	668705	688539	707505	725676	743114	759877	776015	791573	806591	37
	6'	21'	36'	51'	6'	21'	36'	51'	6'	21'	
24	0 3.648274	3.669043	3.688862	3.707815	3.725972	3.743399	3.760151	3.776279	3.791828	3.806837	36
25	15 648628	669381	689185	708123	726268	743683	760425	776543	792082	807082	35
26	30 648983	669719	689508	708432	726564	743968	760699	776807	792337	807328	34
27	45 649336	670056	689830	708740	726861	744252	760972	777070	792590	807574	33
	7	22'	37'	52'	7'	22'	37'	52'	7'	22'	
28	0 3.649690	3.670393	3.690152	3.709049	3.727156	3.744536	3.761245	3.777333	3.792845	3.807819	32
29	15 650043	670730	690474	709357	727452	744820	761518	777596	793098	808064	31
30	30 650396	671067	690795	709665	727747	745103	761791	777859	793352	808309	30
31	45 650749	671403	691117	709972	728042	745387	762064	778122	793606	808554	29
	8'	23'	38'	53'	8'	23'	38'	53'	8'	23'	
32	0 3.651102	3.671739	3.691438	3.710280	3.728337	3.745670	3.762337	3.778385	3.793859	3.808799	28
33	15 651453	672074	691758	710587	728632	745953	762609	778647	794112	809044	27
34	30 651806	672410	692079	710894	728926	746236	762881	778910	794366	809288	26
35	45 652157	672745	692399	711201	729220	746519	763153	779172	794618	809533	25
	9'	24'	39'	54'	9'	24'	39'	54'	9'	24'	
36	0 3.652508	3.673080	3.692720	3.711507	3.729514	3.746801	3.763425	3.779434	3.794872	3.809777	24
37	15 652859	673415	693039	711814	729808	747084	763697	779696	795124	810021	23
38	30 653210	673750	693359	712120	730101	747366	763968	779958	795377	810265	22
39	45 653560	674084	693679	712426	730395	747648	764240	780219	795629	810509	21
	10'	25'	40'	55'	10'	25'	40'	55'	10'	25'	
40	0 3.653911	3.674418	3.693998	3.712731	3.730688	3.747930	3.764511	3.780480	3.795881	3.810753	20
41	15 654260	674751	694317	713037	730981	748211	764782	780741	796133	810996	19
42	30 654610	675085	694636	713342	731274	748493	765053	781003	796385	811240	18
43	45 654959	675418	694954	713647	731567	748774	765323	781263	796637	811483	17
	11'	26'	41'	56'	11'	26'	41'	56'	11'	26'	
44	0 3.655308	3.675751	3.695272	3.713952	3.731859	3.749055	3.765594	3.781524	3.796889	3.811726	16
45	15 655657	676083	695590	714256	732152	749336	765864	781785	797140	811969	15
46	30 656006	676416	695908	714561	732444	749617	766135	782045	797392	812212	14
47	45 656354	676748	696226	714865	732736	749897	766405	782305	797643	812455	13
	12'	27'	42'	57'	12'	27'	42'	57'	12'	27'	
48	0 3.656702	3.677080	3.696543	3.715169	3.733027	3.750178	3.766675	3.782566	3.797894	3.812698	12
49	15 657049	677412	696860	715473	733318	750458	766944	782826	798145	812940	11
50	30 657397	677743	697177	715776	733610	750738	767214	783086	798396	813182	10
51	45 657743	678074	697493	716080	733901	751017	767483	783345	798646	813424	9
	13'	28'	43'	58'	13'	28'	43'	58'	13'	28'	
52	0 3.658090	3.678405	3.697810	3.716383	3.734192	3.751297	3.767752	3.783605	3.798897	3.813667	8
53	15 658437	678736	698126	716686	734482	751576	768021	783864	799147	813908	7
54	30 658783	679066	698442	716988	734773	751856	768290	784123	799397	814150	6
55	45 659129	679396	698758	717291	735063	752135	768559	784382	799647	814392	5
	14'	29'	44'	59'	14'	29'	44'	59'	14'	29'	
56	0 3.659475	3.679726	3.699073	3.717593	3.735353	3.752414	3.768827	3.784641	3.799897	3.814634	4
57	15 659820	680056	699388	717895	735643	752692	769096	784900	800147	814875	3
58	30 660165	680385	699704	718197	735933	752971	769364	785159	800397	815116	2
59	45 660510	680714	700018	718498	736222	753249	769632	785417	800647	815357	1
60	60 3.660855	3.681043	3.700333	3.718800	3.736512	3.753528	3.769900	3.785675	3.800896	3.815598	0
sec.	39m	38m	37m	36m	35m	34m	33m	32m	31m	30m	sec.

23 Hours. 23 Hours.

0 Hours. ½ Log. Haversines. 0 Hours.

sec.	30m	31m	32m	33m	34m	35m	36m	37m	38m	39m	sec.
	7 deg.		8 deg.				9 deg.				
	″ 30′	45′	0′	15′	30′	45′	0′	15′	30′	45′	
0	0 3.815598	3.829818	3.843584	3.856926	3.869868	3.882433	3.894643	3.906517	3.918073	3.929328	60
1	15 815839	830051	843810	857145	870080	882639	894844	906712	918263	929513	59
2	30 816080	830284	844036	857364	870293	882846	895044	906908	918453	929698	58
3	45 816320	830517	844261	857582	870505	883052	895245	907102	918643	929883	57
	31′	46′	1′	16′	31′	46′	1′	16′	31′	46′	
4	0 3.816561	3.830749	3.844487	3.857801	3.870717	3.883258	3.895445	3.907297	3.918833	3.930068	56
5	15 816801	830982	844712	858019	870929	883464	895645	907492	919022	930252	55
6	30 817042	831214	844937	858238	871141	883670	895845	907687	919212	930437	54
7	45 817282	831447	845162	858456	871353	883875	896045	907881	919401	930622	53
	32′	47′	2′	17′	32′	47′	2′	17′	32′	47′	
8	0 3.817522	3.831679	3.845387	3.858674	3.871565	3.884081	3.896245	3.908076	3.919591	3.930806	52
9	15 817761	831911	845612	858892	871776	884287	896445	908271	919780	930991	51
10	30 818001	832143	845837	859110	871988	884492	896645	908465	919970	931175	50
11	45 818240	832375	846061	859328	872199	884698	896845	908659	920159	931359	49
	33′	48′	3′	18′	33′	48′	3′	18′	33′	48′	
12	0 3.818480	3.832607	3.846286	3.859546	3.872410	3.884903	3.897044	3.908853	3.920348	3.931544	48
13	15 818719	832838	846510	859763	872621	885108	897244	909047	920537	931728	47
14	30 818958	833070	846735	859981	872833	885313	897443	909242	920726	931912	46
15	45 819197	833301	846958	860198	873043	885518	897642	909435	920914	932096	45
	34′	49′	4′	19′	34′	49′	4′	19′	34′	49′	
16	0 3.819436	3.833532	3.847183	3.860415	3.873255	3.885723	3.897842	3.909629	3.921103	3.932280	44
17	15 819675	833763	847406	860632	873465	885928	898041	909823	921292	932464	43
18	30 819914	833994	847630	860849	873676	886133	898240	910017	921481	932648	42
19	45 820152	834225	847854	861066	873886	886337	898439	910210	921669	932831	41
	35′	50′	5′	20′	35′	50′	5′	20′	35′	50′	
20	0 3.820390	3.834456	3.848078	3.861283	3.874097	3.886542	3.898638	3.910404	3.921858	3.933015	40
21	15 820628	834686	848301	861500	874307	886746	898836	910597	922046	933198	39
22	30 820867	834917	848524	861717	874518	886950	899035	910791	922234	933382	38
23	45 821104	835147	848747	861933	874728	887154	899233	910984	922422	933565	37
	36′	51′	6′	21′	36′	51′	6′	21′	36′	51′	
24	0 3.821342	3.835377	3.848971	3.862149	3.874938	3.887359	3.899432	3.911177	3.922610	3.933749	36
25	15 821580	835607	849193	862365	875148	887563	899630	911370	922798	933932	35
26	30 821818	835837	849416	862582	875358	887767	899829	911563	922986	934115	34
27	45 822055	836067	849639	862798	875567	887970	900027	911756	923174	934298	33
	37′	52′	7′	22′	37′	52′	7′	22′	37′	52′	
28	0 3.822292	3.836297	3.849862	3.863014	3.875777	3.888174	3.900225	3.911949	3.923362	3.934481	32
29	15 822529	836526	850084	863229	875987	888378	900423	912141	923549	934664	31
30	30 822767	836756	850307	863445	876196	888581	900621	912334	923737	934847	30
31	45 823003	836985	850529	863661	876405	888785	900819	912526	923925	935029	29
	38′	53′	8′	23′	38′	53′	8′	23′	38′	53′	
32	0 3.823240	3.837215	3.850751	3.863877	3.876615	3.888988	3.901017	3.912719	3.924112	3.935212	28
33	15 823477	837443	850973	864092	876824	889191	901214	912912	924299	935395	27
34	30 823713	837673	851195	864307	877033	889395	901412	913104	924487	935577	26
35	45 823950	837901	851417	864522	877242	889597	901609	913296	924674	935760	25
	39′	54′	9′	24′	39′	54′	9′	24′	39′	54′	
36	0 3.824186	3.838130	3.851639	3.864738	3.877451	3.889801	3.901807	3.913488	3.924861	3.935942	24
37	15 824422	838359	851860	864952	877659	890003	902004	913680	925048	936124	23
38	30 824658	838587	852082	865167	877868	890206	902201	913872	925235	936307	22
39	45 824894	838816	852303	865382	878077	890409	902398	914064	925422	936489	21
	40′	55′	10′	25′	40′	55′	10′	25′	40′	55′	
40	0 3.825130	3.839044	3.852524	3.865597	3.878285	3.890612	3.902595	3.914256	3.925609	3.936671	20
41	15 825365	839272	852745	865811	878493	890814	902792	914447	925795	936853	19
42	30 825601	839500	852967	866026	878702	891016	902989	914639	925982	937035	18
43	45 825836	839728	853187	866240	878910	891218	903186	914830	926169	937216	17
	41′	56′	11′	26′	41′	56′	11′	26′	41′	56′	
44	0 3.826072	3.839956	3.853408	3.866454	3.879118	3.891421	3.903383	3.915022	3.926355	3.937398	16
45	15 826306	840183	853629	866668	879326	891623	903579	915213	926541	937580	15
46	30 826542	840411	853850	866883	879534	891825	903776	915404	926728	937762	14
47	45 826776	840638	854070	867096	879741	892027	903972	915595	926914	937943	13
	42′	57′	12′	27′	42′	57′	12′	27′	42′	57′	
48	0 3.827011	3.840866	3.854290	3.867310	3.879949	3.892229	3.904168	3.915787	3.927100	3.938125	12
49	15 827246	841093	854510	867524	880157	892430	904364	915978	927286	938306	11
50	30 827480	841320	854731	867738	880364	892632	904561	916169	927472	938487	10
51	45 827714	841547	854951	867951	880571	892833	904757	916359	927658	938668	9
	43′	58′	13′	28′	43′	58′	13′	28′	43′	58	
52	0 3.827949	3.841774	3.855171	3.868165	3.880779	3.893035	3.904953	3.916550	3.927844	3.938850	8
53	15 828183	842001	855390	868378	880986	893236	905148	916741	928030	939030	7
54	30 828417	842227	855610	868591	881193	893438	905345	916932	928215	939212	6
55	45 828650	842454	855830	868804	881400	893639	905540	917122	928401	939392	5
	44′	59′	14′	29′	44′	59′	14′	29′	44′	59	
56	0 3.828884	3.842680	3.856049	3.869017	3.881607	3.893840	3.905736	3.917312	3.928587	3.939573	4
57	15 829118	842906	856268	869230	881813	894041	905931	917503	928772	939754	3
58	30 829351	843133	856488	869443	882020	894242	906127	917693	928957	939935	2
59	45 829584	843358	856707	869655	882227	894442	906322	917883	929142	940115	1
60	60 3.829818	3.843584	3.856926	3.869868	3.882433	3.894643	3.906517	3.918073	3.929328	3.940296	0
sec.	29m	28m	27m	26m	25m	24m	23m	22m	21m	20m	sec.

23 Hours. 23 Hours.

0 Hours. ½ Log. Haversines. 0 Hours.

sec.	40m	41m	42m	43m	44m	45m	46m	47m	48m	49m	sec.
	10 deg.				11 deg.				12 deg.		
	7'	0'	15'	30'	45'	0'	15'	30'	45'	0'	15'	
0	0	3.940296	3.950992	3.961429	3.971619	3.981573	3.991302	4.000816	4.010124	4.019235	4.028156	60
1	15	940476	951168	961600	971786	981737	991462	000972	010277	019385	028303	59
2	30	940657	951344	961772	971954	981901	991623	001129	010431	019535	028450	58
3	45	940837	951520	961944	972122	982064	991782	001286	010584	019685	028597	57
		1'	16'	31'	46'	1'	16'	31'	46'	1'	16'	
4	0	3.941017	3.951696	3.962116	3.972289	3.982228	3.991943	4.001443	4.010737	4.019835	4.028744	56
5	15	941197	951871	962287	972457	982392	992103	001599	010890	019985	028891	55
6	30	941378	952047	962459	972624	982556	992263	001756	011044	020135	029038	54
7	45	941557	952222	962630	972792	982719	992423	001912	011197	020285	029185	53
		2'	17'	32'	47'	2'	17'	32'	47'	2'	17'	
8	0	3.941738	3.952398	3.962801	3.972959	3.982883	3.992583	4.002069	4.011350	4.020435	4.029332	52
9	15	941917	952573	962972	973126	983046	992742	002225	011503	020584	029478	51
10	30	942097	952749	963144	973294	983210	992902	002381	011656	020734	029625	50
11	45	942277	952924	963315	973461	983373	993062	002537	011808	020884	029771	49
		3'	18'	33'	48'	3'	18'	33'	48'	3'	18'	
12	0	3.942456	3.953100	3.963486	3.973628	3.983536	3.993222	4.002694	4.011962	4.021034	4.029918	48
13	15	942636	953275	963657	973795	983699	993381	002850	012114	021183	030064	47
14	30	942816	953450	963828	973962	983863	993541	003006	012267	021333	030211	46
15	45	942995	953625	963999	974129	984026	993700	003162	012419	021482	030357	45
		4'	19'	34'	49'	4'	19'	34'	49'	4'	19'	
16	0	3.943174	3.953800	3.964170	3.974296	3.984189	3.993860	4.003318	4.012572	4.021632	4.030504	44
17	15	943353	953975	964340	974462	984352	994019	003473	012725	021781	030650	43
18	30	943533	954150	964511	974629	984515	994178	003630	012877	021930	030797	42
19	45	943712	954324	964681	974796	984677	994337	003785	013030	022080	030943	41
		5'	20'	35'	50'	5'	20'	35'	50'	5'	20'	
20	0	3.943891	3.954499	3.964852	3.974962	3.984840	3.994497	4.003941	4.013182	4.022229	4.031089	40
21	15	944070	954673	965022	975129	985003	994656	004096	013334	022378	031235	39
22	30	944249	954848	965193	975295	985166	994815	004252	013487	022527	031381	38
23	45	944427	955022	965363	975461	985328	994974	004408	013639	022676	031527	37
		6'	21'	36'	51'	6'	21'	36'	51'	6'	21'	
24	0	3.944606	3.955197	3.965534	3.975628	3.985491	3.995133	4.004563	4.013791	4.022825	4.031673	36
25	15	944785	955371	965704	975794	985653	995292	004719	013943	022974	031819	35
26	30	944963	955546	965874	975960	985816	995451	004874	014096	023123	031965	34
27	45	945142	955720	966044	976126	985978	995609	005029	014247	023272	032111	33
		7'	22'	37'	52'	7'	22'	37'	52'	7'	22'	
28	0	3.945320	3.955894	3.966214	3.976293	3.986140	3.995768	4.005185	4.014400	4.023421	4.032257	32
29	15	945499	956068	966384	976458	986303	995926	005340	014551	023569	032402	31
30	30	945677	956242	966554	976624	986465	996085	005495	014703	023718	032548	30
31	45	945855	956416	966723	976790	986627	996244	005650	014855	023867	032693	29
		8'	23'	38'	53'	8'	23'	38'	53'	8'	23'	
32	0	3.946033	3.956590	3.966893	3.976956	3.986789	3.996402	4.005805	4.015007	4.024016	4.032839	28
33	15	946211	956763	967063	977122	986951	996561	005960	015158	024164	032985	27
34	30	946390	956937	967233	977288	987113	996719	006115	015310	024313	033130	26
35	45	946567	957111	967402	977453	987275	996877	006270	015462	024461	033276	25
		9'	24'	39'	54'	9'	24'	39'	54'	9'	24'	
36	0	3.946745	3.957284	3.967572	3.977619	3.987437	3.997036	4.006425	4.015613	4.024610	4.033421	24
37	15	946923	957458	967741	977784	987598	997194	006579	015765	024758	033566	23
38	30	947101	957631	967910	977950	987760	997352	006734	015916	024906	033712	22
39	45	947278	957804	968079	978115	987922	997510	006889	016068	025054	033857	21
		10'	25'	40'	55'	10'	25'	40'	55'	10'	25'	
40	0	3.947456	3.957978	3.968249	3.978280	3.988083	3.997668	4.007044	4.016219	4.025203	4.034002	20
41	15	947633	958151	968418	978445	988245	997826	007198	016370	025351	034147	19
42	30	947811	958324	968587	978611	988406	997984	007353	016522	025499	034292	18
43	45	947988	958497	968756	978776	988567	998141	007507	016673	025647	034437	17
		11'	26'	41'	56'	11'	26'	41'	56'	11'	26'	
44	0	3.948166	3.958670	3.968925	3.978941	3.988729	3.998299	4.007661	4.016824	4.025795	4.034582	16
45	15	948342	958843	969093	979106	988890	998457	007816	016975	025943	034727	15
46	30	948520	959016	969262	979271	989051	998615	007970	017126	026091	034872	14
47	45	948697	959189	969431	979435	989212	998772	008124	017277	026238	035017	13
		12'	27'	42'	57'	12'	27'	42'	57'	12'	27'	
48	0	3.948874	3.959361	3.969600	3.979600	3.989374	3.998930	4.008278	4.017428	4.026386	4.035162	12
49	15	949051	959534	969768	979765	989534	999087	008432	017578	026534	035306	11
50	30	949228	959707	969937	979930	989696	999245	008586	017729	026682	035451	10
51	45	949404	959879	970105	980094	989856	999402	008740	017880	026829	035596	9
		13'	28'	43'	58'	13'	28'	43'	58'	13'	28'	
52	0	3.949581	3.960052	3.970274	3.980259	3.990017	3.999559	4.008894	4.018031	4.026977	4.035741	8
53	15	949757	960224	970441	980423	990178	999717	009048	018181	027124	035885	7
54	30	949934	960396	970610	980588	990339	999874	009202	018332	027272	036030	6
55	45	950110	960568	970778	980752	990499	4.000031	009356	018482	027419	036174	5
		14'	29'	44'	59'	14'	29'	44'	59'	14'	29'	
56	0	3.950287	3.960741	3.970947	3.980916	3.990660	4.000188	4.009510	4.018633	4.027567	4.036319	4
57	15	950463	960913	971115	981080	990821	000345	009663	018783	027714	036463	3
58	30	950640	961085	971283	981245	990981	000502	009817	018934	027862	036607	2
59	45	950816	961257	971451	981409	991141	000659	009970	019084	028009	036751	1
60	60	3.950992	3.961429	3.971619	3.981573	3.991302	4.000816	4.010124	4.019235	4.028156	4.036896	0
sec.		19m	18m	17m	16m	15m	14m	13m	12m	11m	10m	sec.

23 Hours. 23 Hours.

0 Hours. ½ Log. Haversines. 0 Hours.

sec.	50m	51m	52m	53m	54m	55m	56m	57m	58m	59m	sec.
	12 deg.		13 deg.				14 deg.				
	″ 30′	45′	0′	15′	30′	45′	0′	15′	30′	45′	
0	0 4.036896	4.045461	4.053859	4.062095	4.070176	4.078107	4.085894	4.093542	4.101056	4.108439	60
1	15 037040	045602	053997	062231	070309	078238	086023	093668	101180	108561	59
2	30 037184	045744	054136	062367	070443	078369	086152	093795	101304	108683	58
3	45 037328	045885	054274	062502	070576	078500	086280	093921	101428	108805	57
	31′	46′	1′	16′	31′	46′	1′	16′	31′	46′	
4	0 4.037472	4.046026	4.054413	4.062639	4.070709	4.078631	4.086409	4.094047	4.101552	4.108927	56
5	15 037616	046167	054551	062774	070842	078762	086537	094173	101676	109049	55
6	30 037760	046308	054689	062910	070976	078892	086665	094300	101800	109171	54
7	45 037904	046449	054828	063045	071109	079023	086794	094425	101924	109292	53
	32′	47′	2′	17′	32′	47′	2′	17′	32′	47′	
8	0 4.038048	4.046590	4.054966	4.063181	4.071242	4.079154	4.086922	4.094552	4.102048	4.109414	52
9	15 038191	046731	055104	063317	071375	079284	087050	094678	102171	109536	51
10	30 038335	046872	055242	063452	071508	079415	087179	094804	102295	109658	50
11	45 038479	047013	055380	063588	071641	079545	087307	094929	102419	109779	49
	33′	48′	3′	18′	33′	48′	3′	18′	33′	48′	
12	0 4.038623	4.047154	4.055519	4.063723	4.071774	4.079676	4.087435	4.095056	4.102543	4.109901	48
13	15 038766	047294	055657	063859	071907	079806	087563	095181	102666	110022	47
14	30 038910	047435	055795	063994	072040	079937	087691	095307	102790	110144	46
15	45 039053	047576	055932	064129	072172	080067	087819	095433	102913	110265	45
	34′	49′	4′	19′	34′	49′	4′	19′	34′	49′	
16	0 4.039197	4.047717	4.056071	4.064265	4.072305	4.080198	4.087947	4.095559	4.103037	4.110387	44
17	15 039340	047857	056208	064400	072438	080328	088075	095684	103161	110508	43
18	30 039483	047998	056346	064535	072571	080458	088203	095810	103284	110630	42
19	45 039626	048138	056484	064670	072703	080588	088331	095936	103408	110751	41
	35′	50′	5′	20′	35′	50′	5′	20′	35′	50′	
20	0 4.039770	4.048279	4.056622	4.064806	4.072836	4.080719	4.088459	4.096061	4.103531	4.110873	40
21	15 039913	048419	056759	064941	072968	080849	088587	096187	103654	110994	39
22	30 040056	048559	056897	065076	073101	080979	088715	096313	103778	111115	38
23	45 040199	048699	057034	065211	073234	081109	088842	096438	103901	111236	37
	36′	51′	6′	21′	36′	51′	6′	21′	36′	51′	
24	0 4.040342	4.048840	4.057172	4.065346	4.073366	4.081239	4.088970	4.096564	4.104025	4.111358	36
25	15 040485	048980	057310	065480	073498	081369	089097	096689	104148	111478	35
26	30 040628	049120	057447	065616	073631	081499	089225	096814	104271	111600	34
27	45 040771	049260	057584	065750	073763	081629	089353	096939	104394	111721	33
	37′	52′	7′	22′	37′	52′	7′	22′	37′	52′	
28	0 4.040914	4.049400	4.057722	4.065885	4.073896	4.081759	4.089480	4.097065	4.104517	4.111842	32
29	15 041057	049540	057859	066020	074028	081889	089608	097190	104640	111963	31
30	30 041200	049680	057997	066155	074160	082019	089735	097316	104764	112084	30
31	45 041342	049820	058134	066289	074292	082148	089863	097440	104886	112205	29
	38′	53′	8′	23′	38′	53′	8′	23′	38′	53′	
32	0 4.041485	4.049960	4.058271	4.066424	4.074424	4.082278	4.089990	4.097566	4.105010	4.112326	28
33	15 041628	050100	058408	066558	074556	082408	090117	097691	105132	112446	27
34	30 041770	050240	058545	066693	074688	082537	090245	097816	105255	112568	26
35	45 041913	050379	058682	066827	074820	082667	090372	097941	105378	112688	25
	39′	54′	9′	24′	39′	54′	9′	24′	39′	54′	
36	0 4.042055	4.050519	4.058819	4.066962	4.074952	4.082797	4.090500	4.098066	4.105501	4.112809	24
37	15 042198	050659	058956	067096	075084	082926	090627	098191	105624	112930	23
38	30 042340	050799	059093	067231	075216	083056	090754	098316	105747	113051	22
39	45 042482	050938	059230	067365	075348	083185	090881	098441	105869	113171	21
	40′	55′	10′	25′	40′	55′	10′	25′	40′	55′	
40	0 4.042625	4.051078	4.059367	4.067499	4.075480	4.083314	4.091008	4.098566	4.105992	4.113292	20
41	15 042767	051217	059504	067633	075611	083444	091135	098691	106115	113412	19
42	30 042909	051357	059641	067768	075743	083573	091262	098816	106238	113533	18
43	45 043051	051496	059777	067902	075875	083702	091389	098940	106360	113653	17
	41′	56′	11′	26′	41′	56′	11′	26′	41′	56′	
44	0 4.043194	4.051635	4.059914	4.068036	4.076007	4.083832	4.091516	4.099065	4.106483	4.113774	16
45	15 043335	051774	060051	068170	076138	083961	091643	099190	106605	113894	15
46	30 043478	051914	060187	068304	076270	084090	091770	099314	106728	114015	14
47	45 043619	052053	060324	068438	076401	084219	091897	099439	106850	114135	13
	42′	57′	12′	27′	42′	57′	12′	27′	42′	57′	
48	0 4.043762	4.052192	4.060460	4.068572	4.076533	4.084348	4.092024	4.099564	4.106973	4.114256	12
49	15 043903	052331	060597	068706	076664	084477	092150	099688	107095	114376	11
50	30 044045	052470	060733	068840	076796	084606	092277	099813	107218	114496	10
51	45 044187	052609	060869	068973	076927	084735	092404	099937	107340	114617	9
	43′	58′	13′	28′	43′	58′	13′	28′	43′	58′	
52	0 4.044329	4.052748	4.061006	4.069107	4.077058	4.084864	4.092530	4.100062	4.107462	4.114737	8
53	15 044470	052887	061142	069241	077189	084993	092657	100186	107584	114857	7
54	30 044612	053026	061278	069375	077321	085122	092784	100310	107707	114977	6
55	45 044754	053165	061414	069508	077452	085251	092910	100434	107829	115096	5
	44′	59′	14′	29′	44′	59′	14′	29′	44′	59′	
56	0 4.044895	4.053304	4.061551	4.069642	4.077583	4.085380	4.093037	4.100559	4.107951	4.115218	4
57	15 045037	053442	061687	069775	077714	085508	093163	100683	108073	115337	3
58	30 045178	053581	061823	069909	077845	085637	093290	100807	108195	115456	2
59	45 045319	053720	061959	070042	077976	085766	093416	100931	108317	115577	1
60	60 4.045461	4.053859	4.062095	4.070176	4.078107	4.085894	4.093542	4.101056	4.108439	4.115691	0
sec.	9m	8m	7m	6m	5m	4m	3m	2m	1m	0m	sec.

23 Hours. 23 Hours.

1 Hour. ½ Log. Haversines. 1 Hour.

Time m s	Arc ° ′	0m	4m	8m	12m	16m	20m	24m	28m	32m	Time s m
		15°	16°	17°	18°	19°	20°	21°	22°	23°	
0 0	0 0	4.115698	4.143555	4.169702	4.194332	4.217609	4.239670	4.260633	4.280599	4.299655	0 2
0 2	0 30	115937	143780	169913	194532	217798	239849	260803	280761	299810	58 1
0 4	1 0	116177	144004	170124	194731	217986	240028	260974	280924	299966	56 1
0 6	1 30	116417	144229	170336	194930	218175	240207	261144	281086	300121	54 1
0 8	2 0	4.116656	4.144453	4.170546	4.195129	4.218363	4.240386	4.261314	4.281248	4.300276	52 1
0 10	2 30	116895	144677	170757	195328	218552	240565	261484	281410	300431	50 1
0 12	3 0	117135	144901	170968	195527	218740	240744	261654	281573	300586	48 1
0 14	3 30	117374	145125	171179	195726	218928	240922	261824	281735	300740	46 1
0 16	4 0	4.117612	4.145349	4.171389	4.195925	4.219116	4.241101	4.261994	4.281897	4.300895	44 1
0 18	4 30	117851	145573	171600	196123	219304	241279	262164	282059	301050	42 1
0 20	5 0	118090	145797	171810	196322	219492	241458	262334	282220	301205	40 1
0 22	5 30	118328	146020	172020	196520	219680	241636	262503	282382	301359	38 1
0 24	6 0	4.118567	4.146243	4.172230	4.196719	4.219868	4.241814	4.262673	4.282544	4.301514	36 1
0 26	6 30	118805	146467	172440	196917	220056	241992	262842	282706	301668	34 1
0 28	7 0	119043	146690	172650	197115	220243	242170	263012	282867	301823	32 1
0 30	7 30	119281	146913	172860	197313	220431	242348	263181	283029	301977	30 1
0 32	8 0	4.119519	4.147136	4.173070	4.197511	4.220618	4.242526	4.263351	4.283190	4.302132	28 1
0 34	8 30	119756	147359	173279	197709	220805	242704	263520	283352	302286	26 1
0 36	9 0	119994	147581	173489	197907	220993	242882	263689	283513	302440	24 1
0 38	9 30	120231	147804	173698	198104	221180	243060	263858	283675	302594	22 1
0 40	10 0	4.120469	4.148026	4.173908	4.198302	4.221367	4.243237	4.264027	4.283836	4.302748	20 1
0 42	10 30	120706	148248	174117	198499	221554	243415	264196	283997	302903	18 1
0 44	11 0	120943	148471	174326	198697	221741	243592	264365	284158	303057	16 1
0 46	11 30	121180	148693	174535	198894	221928	243770	264534	284319	303210	14 1
0 48	12 0	4.121417	4.148915	4.174744	4.199091	4.222115	4.243947	4.264703	4.284480	4.303364	12 1
0 50	12 30	121653	149137	174953	199288	222301	244124	264872	284641	303518	10 1
0 52	13 0	121890	149358	175161	199485	222488	244302	265040	284802	303672	8 1
0 54	13 30	122126	149580	175370	199682	222674	244479	265209	284963	303826	6 1
0 56	14 0	4.122362	4.149801	4.175578	4.199879	4.222861	4.244656	4.265377	4.285124	4.303979	4 1
0 58	14 30	122598	150023	175787	200076	223047	244833	265546	285284	304133	2 1
1 0	15 0	122834	150244	175995	200273	223234	245010	265714	285445	304286	0 1
1 2	15 30	123070	150465	176203	200469	223420	245186	265883	285606	304440	58 0
1 4	16 0	4.123306	4.150686	4.176411	4.200666	4.223606	4.245363	4.266051	4.285766	4.304593	56 0
1 6	16 30	123542	150907	176619	200862	223792	245540	266219	285927	304747	54 0
1 8	17 0	123777	151128	176827	201059	223978	245716	266387	286087	304900	52 0
1 10	17 30	124012	151349	177035	201255	224164	245893	266555	286247	305053	50 0
1 12	18 0	4.124248	4.151569	4.177242	4.201451	4.224349	4.246069	4.266723	4.286408	4.305207	48 0
1 14	18 30	124483	151790	177450	201647	224535	246246	266891	286568	305360	46 0
1 16	19 0	124718	152010	177657	201843	224721	246422	267059	286728	305513	44 0
1 18	19 30	124952	152230	177865	202039	224906	246598	267227	286888	305666	42 0
1 20	20 0	4.125187	4.152451	4.178072	4.202234	4.225092	4.246775	4.267394	4.287048	4.305819	40 0
1 22	20 30	125422	152671	178279	202430	225277	246951	267562	287208	305972	38 0
1 24	21 0	125656	152891	178486	202626	225462	247127	267730	287368	306125	36 0
1 26	21 30	125890	153110	178693	202821	225648	247303	267897	287528	306277	34 0
1 28	22 0	4.126125	4.153330	4.178900	4.203017	4.225833	4.247478	4.268065	4.287687	4.306430	32 0
1 30	22 30	126359	153550	179107	203212	226018	247654	268232	287847	306583	30 0
1 32	23 0	126593	153769	179313	203407	226203	247830	268399	288007	306736	28 0
1 34	23 30	126826	153988	179520	203602	226388	248006	268567	288166	306888	26 0
1 36	24 0	4.127060	4.154208	4.179726	4.203797	4.226572	4.248181	4.268734	4.288326	4.307041	24 0
1 38	24 30	127294	154427	179933	203992	226757	248357	268901	288485	307193	22 0
1 40	25 0	127527	154646	180139	204187	226942	248532	269068	288645	307346	20 0
1 42	25 30	127760	154865	180345	204382	227126	248707	269235	288804	307498	18 0
1 44	26 0	4.127993	4.155083	4.180551	4.204577	4.227311	4.248883	4.269402	4.288964	4.307650	16 0
1 46	26 30	128226	155302	180757	204771	227495	249058	269569	289123	307803	14 0
1 48	27 0	128459	155521	180963	204966	227680	249233	269735	289282	307955	12 0
1 50	27 30	128692	155739	181169	205160	227864	249408	269902	289441	308107	10 0
1 52	28 0	4.128925	4.155957	4.181374	4.205354	4.228048	4.249583	4.270069	4.289600	4.308259	8 0
1 54	28 30	129157	156176	181580	205549	228232	249758	270235	289759	308411	6 0
1 56	29 0	129390	156394	181785	205743	228416	249933	270402	289918	308563	4 0
1 58	29 30	129622	156612	181991	205937	228600	250107	270568	290077	308715	2 0
2 0	30 0	4.129854	4.156830	4.182196	4.206131	4.228784	4.250282	4.270735	4.290236	4.308867	0 0
m Time s		58m	54m	50m	46m	42m	38m	34m	30m	26m	s m Time

22 Hours. 22 Hours.

1 Hour.	½ Log. Haversines.									1 Hour.
	2m	6m	10m	14m	18m	22m	26m	30m	34m	
Time m s	Arc. ′ ″ 15° 30′	16° 30′	17° 30′	18° 30′	19° 30′	20° 30′	21° 30′	22° 30′	23° 30′	Time s m
0 0	30 0 4.129854	4.156830	4.182196	4.206131	4.228784	4.250282	4.270735	4.290236	4.308867	0 2
0 2	30 30 130086	157047	182401	206325	228968	250457	270901	290394	309019	58 1
0 4	31 0 130318	157265	182606	206519	229151	250631	271067	290553	309170	56 1
0 6	31 30 130550	157482	182811	206712	229335	250806	271234	290712	309322	54 1
0 8	32 0 4.130781	4.157700	4.183016	4.206906	4.229518	4.250980	4.271400	4.290870	4.309474	52 1
0 10	32 30 131013	157917	183221	207099	229702	251155	271566	291029	309625	50 1
0 12	33 0 131244	158134	183425	207293	229885	251329	271732	291187	309777	48 1
0 14	30 30 131475	158352	183630	207486	230069	251503	271898	291346	309928	46 1
0 16	34 0 4.131706	4.158569	4.183834	4.207679	4.230252	4.251677	4.272063	4.291504	4.310080	44 1
0 18	34 30 131937	158785	184039	207873	230435	251851	272229	291662	310231	42 1
0 20	35 0 132168	159002	184243	208066	230618	252025	272395	291820	310382	40 1
0 22	35 30 132399	159219	184447	208259	230801	252199	272561	291979	310534	38 1
0 24	36 0 4.132630	4.159435	4.184651	4.208452	4.230984	4.252373	4.272726	4.292137	4.310685	36 1
0 26	36 30 132860	159652	184855	208644	231167	252547	272892	292295	310836	34 1
0 28	37 0 133091	159868	185059	208837	231349	252720	273057	292453	310987	32 1
0 30	37 30 133321	160084	185263	209030	231532	252894	273223	292611	311138	30 1
0 32	38 0 4.133551	4.160300	4.185466	4.209222	4.231714	4.253067	4.273388	4.292768	4.311289	28 1
0 34	38 30 133781	160516	185670	209415	231897	253241	273553	292926	311440	26 1
0 36	39 0 134011	160732	185873	209607	232079	253414	273718	293084	311591	24 1
0 38	39 30 134241	160948	186077	209799	232262	253588	273884	293242	311742	22 1
0 40	40 0 4.134470	4.161164	4.186280	4.209992	4.232444	4.253761	4.274049	4.293399	4.311893	20 1
0 42	40 30 134700	161379	186483	210184	232626	253934	274214	293557	312043	18 1
0 44	41 0 134929	161595	186686	210376	232808	254107	274379	293714	312194	16 1
0 46	41 30 135158	161810	186889	210568	232990	254280	274543	293872	312345	14 1
0 48	42 0 4.135387	4.162025	4.187092	4.210760	4.233172	4.254453	4.274708	4.294029	4.312495	12 1
0 50	42 30 135616	162241	187295	210951	233354	254626	274873	294186	312646	10 1
0 52	43 0 135845	162456	187498	211143	233536	254799	275038	294344	312796	8 1
0 54	43 30 136074	162670	187700	211335	233718	254972	275202	294501	312946	6 1
0 56	44 0 4.136303	4.162885	4.187903	4.211526	4.233899	4.255144	4.275367	4.294658	4.313097	4 1
0 58	44 30 136531	163100	188105	211718	234081	255317	275531	294815	313247	2 1
1 0	45 0 136760	163315	188308	211909	234262	255489	275696	294972	313397	0 1
1 2	45 30 136988	163529	188510	212100	234444	255662	275860	295129	313547	58 0
1 4	46 0 4.137216	4.163743	4.188712	4.212291	4.234625	4.255834	4.276024	4.295286	4.313698	56 0
1 6	46 30 137444	163958	188914	212482	234806	256007	276189	295443	313848	54 0
1 8	47 0 137672	164172	189116	212673	234987	256179	276353	295600	313998	52 0
1 10	47 30 137900	164386	189318	212864	235168	256351	276517	295756	314148	50 0
1 12	48 0 4.138127	4.164600	4.189519	4.213055	4.235349	4.256523	4.276681	4.295913	4.314297	48 0
1 14	48 30 138355	164814	189721	213246	235530	256695	276845	296070	314447	46 0
1 16	49 0 138582	165027	189923	213437	235711	256867	277009	296226	314597	44 0
1 18	49 30 138810	165241	190124	213627	235892	257039	277173	296383	314747	42 0
1 20	50 0 4.139037	4.165454	4.190325	4.213818	4.236073	4.257211	4.277337	4.296539	4.314896	40 0
1 22	50 30 139264	165668	190527	214008	236253	257383	277500	296695	315046	38 0
1 24	51 0 139491	165881	190728	214198	236434	257554	277664	296852	315196	36 0
1 26	51 30 139718	166094	190929	214389	236614	257726	277827	297008	315345	34 0
1 28	52 0 4.139944	4.166307	4.191130	4.214579	4.236795	4.257898	4.277991	4.297164	4.315495	32 0
1 30	52 30 140171	166520	191331	214769	236975	258069	278154	297320	315644	30 0
1 32	53 0 140397	166733	191531	214959	237155	258241	278318	297476	315793	28 0
1 34	53 30 140624	166946	191732	215149	237335	258412	278481	297632	315943	26 0
1 36	54 0 4.140850	4.167159	4.191933	4.215338	4.237515	4.258583	4.278644	4.297788	4.316092	24 0
1 38	54 30 141076	167371	192133	215528	237695	258754	278808	297944	316241	22 0
1 40	55 0 141302	167584	192334	215718	237875	258925	278971	298100	316390	20 0
1 42	55 30 141528	167796	192534	215907	238055	259097	279134	298256	316539	18 0
1 44	56 0 4.141754	4.168008	4.192734	4.216097	4.238235	4.259268	4.279297	4.298412	4.316688	16 0
1 46	56 30 141979	168220	192934	216286	238415	259438	279460	298567	316837	14 0
1 48	57 0 142205	168432	193134	216475	238594	259609	279623	298723	316986	12 0
1 50	57 30 142430	168644	193334	216664	238774	259780	279786	298878	317135	10 0
1 52	58 0 4.142655	4.168856	4.193534	4.216854	4.238953	4.259951	4.279948	4.299034	4.317284	8 0
1 54	58 30 142881	169068	193734	217043	239132	260121	280111	299189	317433	6 0
1 56	59 0 143106	169279	193933	217232	239312	260292	280274	299345	317582	4 0
1 58	59 30 143330	169491	194133	217420	239491	260463	280436	299500	317730	2 0
2 0	60 0 4.143555	4.169702	4.194332	4.217609	4.239670	4.260633	4.280599	4.299655	4.317879	0 0
m s Time	56m	52m	48m	44m	40m	36m	32m	28m	24m	s m Time

1 Hour. ½ Log. Haversines. 2 Hours.

Time m	s	Arc. ′	″	36m	40m	44m	48m	52m	56m	2h 0m	4m	8m	Time s	m
				24°	25°	26°	27°	28°	29°	30°	31°	32°		
0	0	0	0	4.3178794	4.335337	4.352088	4.368185	4.383675	4.398600	4.412996	4.426899	4.440338	0	2
0	2	0	30	318027	335479	352225	368317	383802	398722	413114	427013	440448	58	1
0	4	1	0	318176	335622	352361	368448	383928	398844	413232	427126	440558	56	1
0	6	1	30	318324	335764	352498	368580	384055	398966	413350	427240	440668	54	1
0	8	2	0	4.318473	4.335906	4.352635	4.368711	4.384181	4.399088	4.413467	4.427354	4.440778	52	1
0	10	2	30	318621	336048	352771	368842	384308	399210	413585	427468	440888	50	1
0	12	3	0	318769	336191	352908	368974	384434	399332	413703	427581	440998	48	1
0	14	3	30	318918	336333	353044	369105	384561	399454	413821	427695	441108	46	1
0	16	4	0	4.319066	4.336475	4.353181	4.369236	4.384687	4.399575	4.413938	4.427809	4.441218	44	1
0	18	4	30	319214	336617	353317	369367	384814	399697	414056	427922	441328	42	1
0	20	5	0	319362	336759	353454	369499	384940	399819	414173	428036	441438	40	1
0	22	5	30	319510	336901	353590	369630	385066	399941	414291	428150	441548	38	1
0	24	6	0	4.319658	4.337043	4.353726	4.369761	4.385192	4.400062	4.414408	4.428263	4.441658	36	1
0	26	6	30	319806	337185	353863	369892	385319	400184	414526	428377	441767	34	1
0	28	7	0	319954	337326	353999	370023	385445	400306	414643	428490	441877	32	1
0	30	7	30	320102	337468	354135	370154	385571	400427	414760	428603	441987	30	1
0	32	8	0	4.320249	4.337610	4.354271	4.370285	4.385697	4.400549	4.414878	4.428717	4.442096	28	1
0	34	8	30	320397	337751	354407	370416	385823	400670	414995	428830	442206	26	1
0	36	9	0	320545	337893	354543	370546	385949	400792	415112	428943	442316	24	1
0	38	9	30	320692	338035	354679	370677	386075	400913	415230	429057	442425	22	1
0	40	10	0	4.320840	4.338176	4.354815	4.370808	4.386201	4.401035	4.415347	4.429170	4.442535	20	1
0	42	10	30	320987	338318	354951	370939	386327	401156	415464	429283	442644	18	1
0	44	11	0	321135	338459	355087	371069	386452	401277	415581	429396	442754	16	1
0	46	11	30	321282	338600	355222	371200	386578	401399	415698	429510	442863	14	1
0	48	12	0	4.321430	4.338742	4.355358	4.371330	4.386704	4.401520	4.415815	4.429623	4.442973	12	1
0	50	12	30	321577	338883	355494	371461	386830	401641	415932	429736	443082	10	1
0	52	13	0	321724	339024	355630	371591	386955	401762	416049	429849	443192	8	1
0	54	13	30	321871	339165	355765	371722	387081	401884	416166	429962	443301	6	1
0	56	14	0	4.322019	4.339306	4.355901	4.371852	4.387207	4.402005	4.416283	4.430075	4.443410	4	1
0	58	14	30	322166	339448	356036	371983	387332	402126	416400	430188	443520	2	1
1	0	15	0	322313	339589	356172	372113	387458	402247	416517	430301	443629	0	1
1	2	15	30	322460	339730	356307	372243	387583	402368	416634	430414	443738	58	0
1	4	16	0	4.322607	4.339871	4.356443	4.372373	4.387709	4.402489	4.416751	4.430527	4.443847	56	0
1	6	16	30	322753	340011	356578	372504	387834	402610	416867	430640	443956	54	0
1	8	17	0	322900	340152	356713	372634	387959	402731	416984	430752	444065	52	0
1	10	17	30	323047	340293	356848	372764	388085	402852	417101	430865	444175	50	0
1	12	18	0	4.323194	4.340434	4.356984	4.372894	4.388210	4.402972	4.417217	4.430978	4.444284	48	0
1	14	18	30	323340	340574	357119	373024	388335	403093	417334	431091	444393	46	0
1	16	19	0	323487	340715	357254	373154	388461	403214	417451	431203	444502	44	0
1	18	19	30	323634	340856	357389	373284	388586	403335	417567	431316	444611	42	0
1	20	20	0	4.323780	4.340996	4.357524	4.373414	4.388711	4.403455	4.417684	4.431429	4.444720	40	0
1	22	20	30	323927	341137	357659	373544	388836	403576	417800	431541	444829	38	0
1	24	21	0	324073	341277	357794	373674	388961	403697	417917	431654	444938	36	0
1	26	21	30	324219	341418	357929	373803	389086	403817	418033	431766	445046	34	0
1	28	22	0	4.324366	4.341558	4.358064	4.373933	4.389211	4.403938	4.418149	4.431879	4.445155	32	0
1	30	22	30	324512	341698	358198	374063	389336	404058	418266	431991	445264	30	0
1	32	23	0	324658	341839	358333	374192	389461	404179	418382	432104	445373	28	0
1	34	23	30	324804	341979	358468	374322	389586	404299	418498	432216	445482	26	0
1	36	24	0	4.324950	4.342119	4.358603	4.374452	4.389711	4.404420	4.418615	4.432328	4.445590	24	0
1	38	24	30	325096	342259	358737	374581	389835	404540	418731	432441	445699	22	0
1	40	25	0	325242	342399	358872	374711	389960	404660	418847	432553	445808	20	0
1	42	25	30	325388	342539	359006	374840	390085	404781	418963	432665	445916	18	0
1	44	26	0	4.325534	4.342679	4.359141	4.374970	4.390210	4.404901	4.419079	4.432778	4.446025	16	0
1	46	26	30	325680	342819	359275	375099	390334	405021	419196	432890	446133	14	0
1	48	27	0	325826	342959	359410	375228	390459	405141	419312	433002	446242	12	0
1	50	27	30	325972	343099	359544	375358	390583	405261	419428	433114	446351	10	0
1	52	28	0	4.326117	4.343239	4.359678	4.375487	4.390708	4.405382	4.419544	4.433226	4.446459	8	0
1	54	28	30	326263	343378	359813	375616	390832	405502	419660	433338	446567	6	0
1	56	29	0	326409	343518	359947	375745	390957	405622	419775	433450	446676	4	0
1	58	29	30	326554	343658	360081	375874	391081	405742	419891	433563	446784	2	0
2	0	30	0	4.326700	4.343797	4.360215	4.376003	4.391206	4.405862	4.420007	4.433675	4.446893	0	0
m	s Time			22m	18m	14m	10m	6m	2m 22h	58m	54m	50m	s	m Time

22 Hours. 21 Hours.

1 Hour.			½ Log. Haversines.						2 Hours.			
			38m	42m	46m	50m	54m	58m	2h 2m	6m	10m	
Time m s	Arc. ′ ″		24° 30′	25° 30′	26° 30′	27° 30′	28° 30′	29° 30′	30° 30′	31° 30′	32° 30′	Time s m
0 0	30 0		4.326700	4.343797	4.360215	4.376003	4.391206	4.405862	4.420007	4.433675	4.446893	0 2
0 2	30 30		326845	343937	360349	376132	391330	405982	420123	433786	447001	58 1
0 4	31 0		326990	344076	360483	376261	391454	406102	420239	433898	447109	56 1
0 6	31 30		327136	344216	360617	376390	391579	406221	420355	434010	447218	54 1
0 8	32 0		4.327281	4.344355	4.360751	4.376519	4.391703	4.406341	4.420470	4.434122	4.447326	52 1
0 10	32 30		327426	344495	360885	376648	391827	406461	420586	434234	447434	50 1
0 12	33 0		327571	344634	361019	376777	391951	406581	420702	434346	447542	48 1
0 14	33 30		327717	344773	361153	376906	392075	406701	420817	434458	447650	46 1
0 16	34 0		4.327862	4.344912	4.361287	4.377035	4.392199	4.406820	4.420933	4.434569	4.447759	44 1
0 18	34 30		328007	345052	361421	377163	392323	406940	421048	434681	447867	42 1
0 20	35 0		328152	345191	361554	377292	392447	407060	421164	434793	447975	40 1
0 22	35 30		328297	345330	361688	377421	392571	407179	421280	434904	448083	38 1
0 24	36 0		4.328442	4.345469	4.361822	4.377549	4.392695	4.407299	4.421395	4.435016	4.448191	36 1
0 26	36 30		328586	345608	361955	377678	392819	407418	421510	435128	448299	34 1
0 28	37 0		328731	345747	362089	377806	392943	407538	421626	435239	448407	32 1
0 30	37 30		328876	345886	362222	377935	393067	407657	421741	435351	448515	30 1
0 32	38 0		4.329021	4.346024	4.362356	4.378063	4.393190	4.407777	4.421857	4.435462	4.448623	28 1
0 34	38 30		329165	346163	362489	378192	393314	407896	421972	435574	448731	26 1
0 36	39 0		329310	346302	362623	378320	393438	408015	422087	435685	448838	24 1
0 38	39 30		329454	346441	362756	378448	393562	408135	422202	435797	448946	22 1
0 40	40 0		4.329599	4.346579	4.362889	4.378577	4.393685	4.408254	4.422318	4.435908	4.449054	20 1
0 42	40 30		329743	346718	363022	378705	393809	408373	422433	436019	449162	18 1
0 44	41 0		329887	346857	363156	378833	393932	408492	422548	436131	449269	16 1
0 46	41 30		330032	346995	363289	378961	394056	408611	422663	436242	449377	14 1
0 48	42 0		4.330176	4.347134	4.363422	4.379089	4.394179	4.408731	4.422778	4.436353	4.449485	12 1
0 50	42 30		330320	347272	363555	379217	394303	408850	422893	436464	449592	10 1
0 52	43 0		330464	347410	363688	379345	394426	408969	423008	436576	449700	8 1
0 54	43 30		330609	347549	363821	379473	394550	409088	423123	436687	449808	6 1
0 56	44 0		4.330753	4.347687	4.363954	4.379601	4.394673	4.409207	4.423238	4.436798	4.449915	4 1
0 58	44 30		330897	347825	364087	379729	394796	409326	423353	436909	450023	2 1
1 0	45 0		331041	347963	364220	379857	394919	409445	423468	437020	450130	0 1
1 2	45 30		331185	348102	364352	379985	395043	409563	423583	437131	450238	58 0
1 4	46 0		4.331328	4.348240	4.364485	4.380113	4.395166	4.409682	4.423697	4.437242	4.450345	56 0
1 6	46 30		331472	348378	364618	380241	395289	409801	423812	437353	450453	54 0
1 8	47 0		331616	348516	364751	380368	395412	409920	423927	437464	450560	52 0
1 10	47 30		331760	348654	364883	380496	395535	410039	424042	437575	450667	50 0
1 12	48 0		4.331903	4.348792	4.365016	4.380624	4.395658	4.410157	4.424156	4.437686	4.450775	48 0
1 14	48 30		332047	348930	365148	380751	395781	410276	424271	437797	450882	46 0
1 16	49 0		332191	349067	365281	380879	395904	410395	424386	437908	450989	44 0
1 18	49 30		332334	349205	365413	381006	396027	410513	424500	438018	451096	42 0
1 20	50 0		4.332478	4.349343	4.365546	4.381134	4.396150	4.410632	4.424615	4.438129	4.451204	40 0
1 22	50 30		332621	349481	365678	381261	396273	410750	424729	438240	451311	38 0
1 24	51 0		332764	349618	365810	381389	396395	410869	424844	438351	451418	36 0
1 26	51 30		332908	349756	365943	381516	396518	410987	424958	438461	451525	34 0
1 28	52 0		4.333051	4.349893	4.366075	4.381643	4.396641	4.411106	4.425073	4.438572	4.451632	32 0
1 30	52 30		333194	350031	366207	381771	396764	411224	425187	438682	451739	30 0
1 32	53 0		333337	350168	366339	381898	396886	411343	425301	438793	451846	28 0
1 34	53 30		333481	350306	366471	382025	397009	411461	425416	438904	451953	26 0
1 36	54 0		4.333624	4.350443	4.366604	4.382152	4.397131	4.411579	4.425530	4.439014	4.452060	24 0
1 38	54 30		333767	350580	366736	382279	397254	411698	425644	439125	452167	22 0
1 40	55 0		333910	350718	366868	382406	397377	411816	425758	439235	452274	20 0
1 42	55 30		334053	350855	367000	382533	397499	411934	425873	439346	452381	18 0
1 44	56 0		4.334195	4.350992	4.367131	4.382660	4.397621	4.412052	4.425987	4.439456	4.452488	16 0
1 46	56 30		334338	351129	367263	382787	397744	412170	426101	439566	452595	14 0
1 48	57 0		334481	351266	367395	382914	397866	412288	426215	439677	452702	12 0
1 50	57 30		334624	351403	367527	383041	397989	412406	426329	439787	452808	10 0
1 52	58 0		4.334766	4.351540	4.367659	4.383168	4.398111	4.412524	4.426443	4.439897	4.452915	8 0
1 54	58 30		334909	351677	367790	383295	398233	412642	426557	440007	453022	6 0
1 56	59 0		335052	351814	367922	383422	398355	412760	426671	440118	453128	4 0
1 58	59 30		335194	351951	368054	383548	398477	412878	426785	440228	453235	2 0
2 0	60 0		4.335337	4.352088	4.368185	4.383675	4.398600	4.412996	4.426899	4.440338	4.453342	0 0
m s Time			20m	16m	12m	8m	4m	0m 22h	56m	52m	48m	s m Time

22 Hours. 21 Hours.

2 Hours. ½ Log. Haversines. 2 Hours.

Time m s	Arc. ° ′	12m	16m	20m	24m	28m	32m	36m	40m	44m	Time s m
		33°	34°	35°	36°	37°	38°	39°	40°	41°	
0 0	0 0	4.453342	4.465935	4.478142	4.489982	4.501476	4.512642	4.523495	4.534052	4.544325	0 2
0 2	0 30	453448	466039	478242	490080	501571	512734	523584	534138	544410	58 1
0 4	1 0	453555	466142	478342	490177	501665	512825	523674	534225	544494	56 1
0 6	1 30	453661	466245	478442	490274	501759	512917	523763	534312	544579	54 1
0 8	2 0	4.453768	4.466348	4.478542	4.490371	4.501854	4.513009	4.523852	4.534399	4.544663	52 1
0 10	2 30	453875	466451	478642	490468	501948	513100	523941	534485	544747	50 1
0 12	3 0	453981	466555	478742	490565	502042	513192	524030	534572	544832	48 1
0 14	3 30	454087	466658	478842	490662	502137	513283	524119	534659	544916	46 1
0 16	4 0	4.454194	4.466761	4.478942	4.490759	4.502231	4.513375	4.524208	4.534745	4.545000	44 1
0 18	4 30	454300	466864	479042	490856	502325	513466	524297	534832	545085	42 1
0 20	5 0	454407	466967	479142	490953	502419	513558	524386	534918	545169	40 1
0 22	5 30	454513	467070	479242	491050	502513	513650	524475	535005	545253	38 1
0 24	6 0	4.454619	4.467173	4.479342	4.491147	4.502607	4.513741	4.524564	4.535091	4.545338	36 1
0 26	6 30	454725	467276	479442	491244	502702	513832	524653	535178	545422	34 1
0 28	7 0	454832	467379	479542	491341	502796	513924	524742	535265	545506	32 1
0 30	7 30	454938	467482	479642	491438	502890	514015	524831	535351	545590	30 1
0 32	8 0	4.455044	4.467585	4.479741	4.491534	4.502984	4.514107	4.524920	4.535437	4.545674	28 1
0 34	8 30	455150	467688	479841	491631	503078	514198	525008	535524	545759	26 1
0 36	9 0	455256	467790	479941	491728	503172	514289	525097	535610	545843	24 1
0 38	9 30	455362	467893	480040	491825	503266	514381	525186	535697	545927	22 1
0 40	10 0	4.455469	4.467996	4.480140	4.491922	4.503360	4.514472	4.525275	4.535783	4.546011	20 1
0 42	10 30	455575	468099	480240	492018	503454	514563	525364	535870	546095	18 1
0 44	11 0	455681	468201	480339	492115	503547	514655	525452	535956	546179	16 1
0 46	11 30	455787	468304	480439	492212	503641	514746	525541	536042	546263	14 1
0 48	12 0	4.455893	4.468407	4.480538	4.492308	4.503735	4.514837	4.525630	4.536129	4.546347	12 1
0 50	12 30	455998	468509	480638	492405	503829	514928	525718	536215	546431	10 1
0 52	13 0	456104	468612	480738	492501	503923	515019	525807	536301	546515	8 1
0 54	13 30	456210	468715	480837	492598	504017	515111	525896	536387	546599	6 1
0 56	14 0	4.456316	4.468817	4.480937	4.492695	4.504110	4.515202	4.525984	4.536474	4.546683	4 1
0 58	14 30	456422	468920	481036	492791	504204	515293	526073	536560	546767	2 1
1 0	15 0	456528	469022	481135	492888	504298	515384	526162	536646	546851	0 1
1 2	15 30	456633	469125	481235	492984	504392	515475	526250	536732	546935	58 0
1 4	16 0	4.456739	4.469227	4.481334	4.493081	4.504485	4.515566	4.526339	4.536818	4.547019	56 0
1 6	16 30	456845	469330	481434	493177	504579	515657	526427	536904	547103	54 0
1 8	17 0	456951	469432	481533	493273	504673	515748	526516	536991	547187	52 0
1 10	17 30	457056	469535	481632	493370	504766	515839	526604	537077	547270	50 0
1 12	18 0	4.457162	4.469637	4.481731	4.493466	4.504860	4.515930	4.526693	4.537163	4.547354	48 0
1 14	18 30	457267	469739	481831	493562	504953	516021	526781	537249	547438	46 0
1 16	19 0	457373	469842	481930	493659	505047	516112	526870	537335	547521	44 0
1 18	19 30	457478	469944	482029	493755	505140	516203	526958	537421	547605	42 0
1 20	20 0	4.457584	4.470046	4.482128	4.493851	4.505234	4.516294	4.527046	4.537507	4.547689	40 0
1 22	20 30	457689	470148	482227	493947	505327	516384	527135	537593	547773	38 0
1 24	21 0	457795	470250	482327	494044	505421	516475	527223	537679	547857	36 0
1 26	21 30	457900	470353	482426	494140	505514	516566	527311	537765	547940	34 0
1 28	22 0	4.458006	4.470455	4.482525	4.494236	4.505608	4.516657	4.527400	4.537851	4.548024	32 0
1 30	22 30	458111	470557	482624	494332	505701	516748	527488	537937	548108	30 0
1 32	23 0	458216	470659	482723	494428	505794	516838	527576	538023	548191	28 0
1 34	23 30	458322	470761	482822	494524	505888	516929	527664	538108	548275	26 0
1 36	24 0	4.458427	4.470863	4.482921	4.494620	4.505981	4.517020	4.527753	4.538194	4.548358	24 0
1 38	24 30	458532	470965	483020	494717	506074	517110	527841	538280	548442	22 0
1 40	25 0	458638	471067	483119	494813	506168	517201	527929	538366	548526	20 0
1 42	25 30	458743	471169	483218	494909	506261	517292	528017	538452	548609	18 0
1 44	26 0	4.458848	4.471271	4.483316	4.495005	4.506354	4.517382	4.528105	4.538537	4.548693	16 0
1 46	26 30	458953	471373	483415	495100	506447	517473	528193	538623	548776	14 0
1 48	27 0	459058	471475	483514	495196	506541	517564	528281	538709	548860	12 0
1 50	27 30	459163	471577	483613	495292	506634	517654	528370	538795	548943	10 0
1 52	28 0	4.459268	4.471678	4.483712	4.495388	4.506727	4.517745	4.528458	4.53888c	4.549027	8 0
1 54	28 30	453373	471780	483810	495484	506820	517835	528546	538966	549110	6 0
1 56	29 0	459478	471882	483909	49558c	506913	517926	528634	539052	549193	4 0
1 58	29 30	459583	471984	484008	495676	507006	518016	528722	539137	549277	2 0
2 0	10 0	4.459688	4.472086	4.484107	4.495772	4.507099	4.518107	4.528810	4.5392234	4.549360	0 0
m s Time		46m	42m	38m	34m	30m	26m	22m	18m	14m	s m Time

21 Hours. 21 Hours.

2 Hours.		½ Log. Haversines.								2 Hours.
		14m	18m	22m	26m	30m	34m	38m	42m	46m	
Time m s	Arc. ′ ″	33° 30′	34° 30′	35° 30′	36° 30′	37° 30′	38° 30′	39° 30′	40° 30′	41° 30′	Time s m
0 0	30 0	4.459688	4.472086	4.484107	4.495772	4.507099	4.518107	4.528810	4.539223	4.549360	0 2
0 2	30 30	459793	472187	484205	495867	507192	518197	528898	539309	549443	58 1
0 4	31 0	459898	472289	484304	495963	507285	518287	528986	539394	549527	56 1
0 6	31 30	460003	472391	484402	496059	507378	518378	529073	539480	549610	54 1
0 8	32 0	4.460108	4.472492	4.484501	4.496154	4.507471	4.518468	4.529161	4.539565	4.549693	52 1
0 10	32 30	460213	472594	484600	496250	507564	518559	529249	539651	549777	50 1
0 12	33 0	460317	472695	484698	496346	507657	518649	529337	539736	549860	48 1
0 14	33 30	460422	472797	484797	496441	507750	518739	529425	539822	549943	46 1
0 16	34 0	4.460527	4.472898	4.484895	4.496537	4.507843	4.518829	4.529513	4.539907	4.550026	44 1
0 18	34 30	460632	473000	484994	496633	507936	518920	529601	539993	550110	42 1
0 20	35 0	460736	473101	485092	496728	508028	519010	529688	540078	550193	40 1
0 22	35 30	460841	473203	485190	496824	508121	519100	529776	540163	550276	38 1
0 24	36 0	4.460946	4.473304	4.485289	4.496919	4.508214	4.519190	4.529864	4.540249	4.550359	36 1
0 26	36 30	461050	473406	485387	497015	508307	519281	529951	540334	550442	34 1
0 28	37 0	461155	473507	485485	497110	508400	519371	530039	540420	550525	32 1
0 30	37 30	461259	473608	485584	497206	508492	519461	530127	540505	550608	30 1
0 32	38 0	4.461364	4.473710	4.485682	4.497301	4.508585	4.519551	4.530215	4.540590	4.550692	28 1
0 34	38 30	461468	473811	485780	497396	508678	519641	530302	540676	550775	26 1
0 36	39 0	461573	473912	485878	497492	508770	519731	530390	540761	550858	24 1
0 38	39 30	461677	474013	485977	497587	508863	519821	530477	540846	550941	22 1
0 40	40 0	4.461782	4.474115	4.486075	4.497682	4.508956	4.519911	4.530565	4.540931	4.551024	20 1
0 42	40 30	461886	474216	486173	497778	509048	520001	530652	541017	551107	18 1
0 44	41 0	461990	474317	486271	497873	509141	520091	530740	541102	551190	16 1
0 46	41 30	462095	474418	486369	497968	509233	520181	530828	541187	551273	14 1
0 48	42 0	4.462199	4.474519	4.486467	4.498063	4.509326	4.520271	4.530915	4.541272	4.551356	12 1
0 50	42 30	462303	474620	486565	498159	509418	520361	531002	541357	551438	10 1
0 52	43 0	462407	474721	486663	498254	509511	520451	531090	541442	551521	8 1
0 54	43 30	462512	474822	486761	498349	509603	520541	531177	541527	551604	6 1
0 56	44 0	4.462616	4.474923	4.486859	4.498444	4.509696	4.520631	4.531265	4.541613	4.551687	4 1
0 58	44 30	462720	475024	486957	498539	509788	520720	531352	541698	551770	2 1
1 0	45 0	462824	475125	487055	498634	509880	520810	531440	541783	551853	0 1
1 2	45 30	462928	475226	487153	498729	509973	520900	531527	541868	551936	58 0
1 4	46 0	4.463032	4.475327	4.487251	4.498824	4.510065	4.520990	4.531614	4.541953	4.552018	56 0
1 6	46 30	463136	475428	487349	498919	510157	521080	531702	542038	552101	54 0
1 8	47 0	463240	475529	487447	499014	510250	521169	531789	542123	552184	52 0
1 10	47 30	463344	475630	487545	499109	510342	521259	531876	542208	552267	50 0
1 12	48 0	4.463448	4.475730	4.487643	4.499204	4.510434	4.521349	4.531963	4.542293	4.552349	48 0
1 14	48 30	463552	475831	487740	499299	510526	521438	532051	542377	552432	46 0
1 16	49 0	463656	475932	487838	499394	510619	521528	532138	542462	552515	44 0
1 18	49 30	463760	476033	487936	499489	510711	521618	532225	542547	552597	42 0
1 20	50 0	4.463864	4.476133	4.488033	4.499584	4.510803	4.521707	4.532312	4.542632	4.552680	40 0
1 22	50 30	463968	476234	488131	499679	510895	521797	532399	542717	552763	38 0
1 24	51 0	464071	476335	488229	499774	510987	521886	532487	542802	552845	36 0
1 26	51 30	464175	476435	488326	499868	511079	521976	532574	542887	552928	34 0
1 28	52 0	4.464279	4.476536	4.488424	4.499963	4.511172	4.522066	4.532661	4.542971	4.553010	32 0
1 30	52 30	464383	476636	488522	500058	511264	522155	532748	543056	553093	30 0
1 32	53 0	464486	476737	488619	500153	511356	522245	532835	543141	553175	28 0
1 34	53 30	464590	476837	488717	500247	511448	522334	532922	543226	553258	26 0
1 36	54 0	4.464694	4.476938	4.488814	4.500342	4.511540	4.522423	4.533009	4.543310	4.553341	24 0
1 38	54 30	464797	477038	488912	500437	511632	522513	533096	543395	553423	22 0
1 40	55 0	464901	477139	489009	500531	511724	522602	533183	543480	553505	20 0
1 42	55 30	465004	477239	489107	500626	511815	522692	533270	543564	553588	18 0
1 44	56 0	4.465108	4.477340	4.489204	4.500721	4.511907	4.522781	4.533357	4.543649	4.553670	16 0
1 46	56 30	465212	477440	48930	500815	511999	522870	533444	543733	553753	14 0
1 48	57 0	465315	477540	489399	500910	512091	522960	533531	543818	553835	12 0
1 50	57 30	465418	477641	489496	501004	512183	523049	533618	543903	553918	10 0
1 52	58 0	4.465522	4.477741	4.489593	4.501099	4.512275	4.523138	4.533704	4.543987	4.554000	8 0
1 54	58 30	465625	477841	489691	501193	512367	523228	533791	544072	554082	6 0
1 56	59 0	465729	477941	489788	501288	512458	523317	533878	544156	554165	4 0
1 58	59 30	465832	478042	489885	501382	512550	523406	533965	544241	554247	2 0
2 0	60 0	4.465935	4.478142	4.489982	4.501476	4.512642	4.523495	4.534052	4.544325	4.554329	0 0
m s Time		44m	40m	36m	32m	28m	24m	20m	16m	12m	s m Time

2 Hours.			½ Log. Haversines.								3 Hours.	
			48m	52m	56m	3h 0m	4m	8m	12m	16m	20m	
Time m	h	Arc. ′	″	42°	43°	44°	45°	46°	47°	48°	49°	50°	Time s	m
0	0	0	0	4·554329	4·564075	4·573575	4·582840	4·591878	4·600700	4·609313	4·617727	4·625948	0	2
0	2	0	30	554411	564156	573654	582916	591952	600772	609384	617796	626016	58	1
0	4	1	0	554494	564236	573732	582992	592027	600845	609455	617865	626084	56	1
0	6	1	30	554576	564316	573810	583068	592101	600917	609526	617935	626151	54	1
0	8	2	0	4·554658	4·564396	4·573888	4·583144	4·592175	4·600990	4·609597	4·618004	4·626219	52	1
0	10	2	30	554740	564476	573966	583221	592250	601063	609668	618073	626287	50	1
0	12	3	0	554822	564556	574044	583297	592324	601135	609739	618142	626354	48	1
0	14	3	30	554905	564636	574122	583373	592398	601208	609809	618212	626422	46	1
0	16	4	0	4·554987	4·564716	4·574200	4·583449	4·592473	4·601280	4·609880	4·618281	4·626490	44	1
0	18	4	30	555069	564796	574278	583525	592547	601353	609951	618350	626557	42	1
0	20	5	0	555151	564876	574356	583601	592621	601425	610022	618419	626625	40	1
0	22	5	30	555233	564956	574434	583677	592696	601498	610093	618488	626692	38	1
0	24	6	0	4·555315	4·565036	4·574512	4·583753	4·592770	4·601570	4·610163	4·618558	4·626760	36	1
0	26	6	30	555397	565116	574590	583830	592844	601643	610234	618627	626828	34	1
0	28	7	0	555479	565196	574668	583906	592918	601715	610305	618696	626895	32	1
0	30	7	30	555561	565276	574746	583982	592992	601788	610376	618765	626963	30	1
0	32	8	0	4·555643	4·565356	4·574824	4·584058	4·593067	4·601860	4·610446	4·618834	4·627030	28	1
0	34	8	30	555725	565436	574902	584134	593141	601932	610517	618903	627098	26	1
0	36	9	0	555807	565516	574980	584210	593215	602005	610588	618972	627165	24	1
0	38	9	30	555889	565596	575058	584285	593289	602077	610659	619041	627233	22	1
0	40	10	0	4·555971	4·565676	4·575136	4·584361	4·593363	4·602149	4·610729	4·619110	4·627300	20	1
0	42	10	30	556053	565755	575213	584437	593437	602222	610800	619179	627368	18	1
0	44	11	0	556135	565835	575291	584513	593511	602294	610870	619248	627435	16	1
0	46	11	30	556217	565915	575369	584589	593585	602366	610941	619317	627503	14	1
0	48	12	0	4·556299	4·565995	4·575447	4·584665	4·593659	4·602439	4·611012	4·619386	4·627570	12	1
0	50	12	30	556380	566074	575525	584741	593733	602511	611082	619455	627637	10	1
0	52	13	0	556462	566154	575602	584817	593807	602583	611153	619524	627705	8	1
0	54	13	30	556544	566234	575680	584893	593881	602656	611223	619593	627772	6	1
0	56	14	0	4·556626	4·566314	4·575758	4·584968	4·593955	4·602728	4·611294	4·619662	4·627840	4	1
0	58	14	30	556708	566393	575835	585044	594029	602800	611365	619731	627907	2	1
1	0	15	0	556789	566473	575913	585120	594103	602872	611435	619800	627974	0	1
1	2	15	30	556871	566553	575991	585196	594177	602944	611506	619869	628042	58	0
1	4	16	0	4·556953	4·566632	4·576068	4·585272	4·594251	4·603017	4·611576	4·619938	4·628109	56	0
1	6	16	30	557035	566712	576146	585347	594325	603089	611647	620007	628176	54	0
1	8	17	0	557116	566792	576224	585423	594399	603161	611717	620075	628244	52	0
1	10	17	30	557198	566871	576301	585499	594473	603233	611788	620144	628311	50	0
1	12	18	0	4·557280	4·566951	4·576379	4·585574	4·594547	4·603305	4·611858	4·620213	4·628378	48	0
1	14	18	30	557361	567030	576457	585650	594621	603377	611928	620282	628445	46	0
1	16	19	0	557443	567110	576534	585726	594695	603449	611999	620351	628513	44	0
1	18	19	30	557524	567189	576612	585801	594768	603521	612069	620420	628580	42	0
1	20	20	0	4·557606	4·567269	4·576689	4·585877	4·594842	4·603594	4·612140	4·620488	4·628647	40	0
1	22	20	30	557687	567348	576767	585953	594916	603666	612210	620557	628714	38	0
1	24	21	0	557769	567428	576844	586028	594990	603738	612280	620626	628782	36	0
1	26	21	30	557851	567507	576922	586104	595064	603810	612351	620695	628849	34	0
1	28	22	0	4·557932	4·567587	4·576999	4·586179	4·595137	4·603882	4·612421	4·620763	4·628916	32	0
1	30	22	30	558014	567666	577077	586255	595211	603954	612491	620832	628983	30	0
1	32	23	0	558095	567746	577154	586330	595285	604026	612562	620901	629050	28	0
1	34	23	30	558176	567825	577231	586406	595358	604098	612632	620969	629117	26	0
1	36	24	0	4·558258	4·567904	4·577309	4·586482	4·595432	4·604170	4·612702	4·621038	4·629184	24	0
1	38	24	30	558339	567984	577386	586557	595506	604242	612773	621107	629252	22	0
1	40	25	0	558421	568063	577464	586632	595579	604313	612843	621175	629319	20	0
1	42	25	30	558502	568142	577541	586708	595653	604385	612913	621244	629386	18	0
1	44	26	0	4·558583	4·568222	4·577618	4·586783	4·595727	4·604457	4·612983	4·621313	4·629453	16	0
1	46	26	30	558665	568301	577696	586859	595800	604529	613053	621381	629520	14	0
1	48	27	0	558746	568380	577773	586934	595874	604601	613124	621450	629587	12	0
1	50	27	30	558827	568459	577850	587010	595948	604673	613194	621518	629654	10	0
1	52	28	0	4·558909	4·568539	4·577927	4·587085	4·596021	4·604745	4·613264	4·621587	4·629721	8	0
1	54	28	30	558990	568618	578005	587160	596095	604817	613334	621656	629788	6	0
1	56	29	0	559071	568697	578082	587236	596168	604888	613404	621724	629855	4	0
1	58	29	30	559152	568776	578159	587311	596242	604960	613474	621793	629922	2	0
2	0	30	0	4·559234	4·568855	4·578236	4·587386	4·596315	4·605032	4·613545	4·621861	4·629989	0	0
m Time				10m	6m	2m 21h	58m	54m	50m	46m	42m	38m	s Time	m

21 Hours. 20 Hours.

2 Hours.			½ Log. Haversines.								3 Hours.	
			50m	54m	58m	3h 2m	6m	10m	14m	18m	22m	
Time m s	Arc. ′ ″		42° 30′	43° 30′	44° 30′	45° 30′	46° 30′	47° 30′	48° 30′	49° 30′	50° 30′	Time s m
0 0	30 0		4.559234	4.568855	4.578236	4.587386	4.596315	4.605032	4.613545	4.621861	4.629989	0 2
0 2	30 30		559315	568935	578314	587462	596389	605104	613615	621930	630056	58 1
0 4	31 0		559396	569014	578391	587537	596462	605175	613685	621998	630123	56 1
0 6	31 30		559477	569093	578468	587612	596536	605247	613755	622067	630190	54 1
0 8	32 0		4.559558	4.569172	4.578545	4.587688	4.596609	4.605319	4.613825	4.622135	4.630257	52 1
0 10	32 30		559640	569251	578622	587763	596683	605391	613895	622204	630324	50 1
0 12	33 0		559721	569330	578699	587838	596756	605462	613965	622272	630391	48 1
0 14	33 30		559802	569409	578776	587913	596830	605534	614035	622340	630457	46 1
0 16	34 0		4.559883	4.569488	4.578853	4.587988	4.596903	4.605606	4.614105	4.622409	4.630524	44 1
0 18	34 30		559964	569567	578930	588064	596976	605677	614175	622477	630591	42 1
0 20	35 0		560045	569646	579008	588139	597050	605749	614245	622546	630658	40 1
0 22	35 30		560126	569725	579085	588214	597123	605821	614315	622614	630725	38 1
0 24	36 0		4.560207	4.569804	4.579162	4.588289	4.597196	4.605892	4.614385	4.622682	4.630792	36 1
0 26	36 30		560288	569883	579239	588364	597270	605964	614455	622751	630858	34 1
0 28	37 0		560369	569962	579316	588439	597343	606035	614525	622819	630925	32 1
0 30	37 30		560450	570041	579393	588514	597416	606107	614595	622887	630992	30 1
0 32	38 0		4.560531	4.570120	4.579469	4.588590	4.597490	4.606179	4.614665	4.622956	4.631059	28 1
0 34	38 30		560612	570199	579546	588665	597563	606250	614735	623024	631126	26 1
0 36	39 0		560693	570278	579623	588740	597636	606322	614804	623092	631192	24 1
0 38	39 30		560774	570357	579700	588815	597709	606393	614874	623160	631259	22 1
0 40	40 0		4.560855	4.570435	4.579777	4.588890	4.597783	4.606465	4.614944	4.623229	4.631326	20 1
0 42	40 30		560935	570514	579854	588965	597856	606536	615014	623297	631392	18 1
0 44	41 0		561016	570593	579931	589040	597929	606608	615084	623365	631459	16 1
0 46	41 30		561097	570672	580008	589115	598002	606679	615154	623433	631526	14 1
0 48	42 0		4.561178	4.570751	4.580084	4.589190	4.598075	4.606751	4.615223	4.623502	4.631593	12 1
0 50	42 30		561259	570829	580161	589265	598149	606822	615293	623570	631659	10 1
0 52	43 0		561339	570908	580238	589339	598222	606893	615363	623638	631726	8 1
0 54	43 30		561420	570987	580315	589414	598295	606965	615433	623706	631792	6 1
0 56	44 0		4.561501	4.571066	4.580392	4.589489	4.598368	4.607036	4.615502	4.623774	4.631859	4 1
0 58	44 30		561582	571144	580468	589564	598441	607108	615572	623842	631926	2 1
1 0	45 0		561662	571223	580545	589639	598514	607179	615642	623911	631992	0 1
1 2	45 30		561743	571302	580622	589714	598587	607250	615712	623979	632059	58 0
1 4	46 0		4.561824	4.571380	4.580699	4.589789	4.598660	4.607322	4.615781	4.624047	4.632125	56 0
1 6	46 30		561904	571459	580775	589864	598733	607393	615851	624115	632192	54 0
1 8	47 0		561985	571537	580852	589938	598806	607464	615921	624183	632259	52 0
1 10	47 30		562066	571616	580929	590013	598879	607535	615990	624251	632325	50 0
1 12	48 0		4.562146	4.571695	4.581005	4.590088	4.598952	4.607607	4.616060	4.624319	4.632392	48 0
1 14	48 30		562227	571773	581082	590163	599025	607678	616129	624387	632458	46 0
1 16	49 0		562307	571852	581158	590237	599098	607749	616199	624455	632525	44 0
1 18	49 30		562388	571930	581235	590312	599171	607821	616269	624523	632591	42 0
1 20	50 0		4.562468	4.572009	4.581312	4.590387	4.599244	4.607892	4.616338	4.624591	4.632658	40 0
1 22	50 30		562549	572087	581388	590462	599317	607963	616408	624659	632724	38 0
1 24	51 0		562629	572166	581465	590536	599390	608034	616477	624727	632790	36 0
1 26	51 30		562710	572244	581541	590611	599463	608105	616547	624795	932857	34 0
1 28	52 0		4.562790	4.572323	4.581618	4.590686	4.599536	4.608176	4.616616	4.624863	4.632923	32 0
1 30	52 30		562871	572401	581694	590760	599608	608248	616686	624931	632990	30 0
1 32	53 0		562951	572479	581771	590835	599681	608319	616755	624999	633056	28 0
1 34	53 30		563032	572558	581847	590909	599754	608390	616825	625067	633122	26 0
1 36	54 0		4.563112	4.572636	4.581924	4.590984	4.599827	4.608461	4.616894	4.625135	4.633189	24 0
1 38	54 30		563192	572715	582000	591059	599900	608532	616964	625202	633255	22 0
1 40	55 0		563273	572793	582076	591133	599973	608603	617033	625270	633322	20 0
1 42	55 30		563353	572871	582153	591208	600045	608674	617103	625338	633388	18 0
1 44	56 0		4.563433	4.572949	4.582229	4.591282	4.600118	4.608745	4.617172	4.625406	4.633454	16 0
1 46	56 30		563514	573028	582305	591357	600191	608816	617241	625474	633520	14 0
1 48	57 0		563594	573106	582382	591431	600264	608887	617311	625542	633587	12 0
1 50	57 30		563674	573184	582458	591506	600336	608958	617380	625609	633653	10 0
1 52	58 0		4.563755	4.573263	4.582534	4.591580	4.600409	4.609029	4.617450	4.625677	4.633719	8 0
1 54	58 30		563835	573341	582611	591655	600482	609100	617519	625745	633786	6 0
1 56	59 0		563915	573419	582687	591729	600554	609171	617588	625813	633852	4 0
1 58	59 30		563995	573497	582763	591804	600627	609242	617658	625880	633918	2 0
2 0	60 0		4.564075	4.573575	4.582840	4.591878	4.600700	4.609313	4.617727	4.625948	4.633984	0 0
m s Time			8m	4m	0m 21h	56m	52m	48m	44m	40m	36m	s m Time

21 Hours. 20 Hours.

3 Hours. ½ Log. Haversines. 3 Hours.

Time m s	Arc. ° ′ ″	24m 51°	28m 52°	32m 53°	36m 54°	40m 55°	44m 56°	48m 57°	52m 58°	56m 59°	Time s m
0 0	0 0	4.633984	4.641842	4.649527	4.657047	4.664406	4.671609	4.678663	4.685571	4.692339	0 2
0 2	0 30	634051	641907	649591	657109	664466	671669	678721	685628	692395	58 1
0 4	1 0	634117	641971	649654	657171	664527	671728	678779	685685	692450	56 1
0 6	1 30	634183	642036	649717	657233	664588	671787	678837	685742	692506	54 1
0 8	2 0	4.634249	4.642101	4.649781	4.657295	4.664648	4.671847	4.678895	4.685799	4.692562	52 1
0 10	2 30	634315	642166	649844	657356	664709	671906	678954	685856	692618	50 1
0 12	3 0	634381	642230	649907	657418	664769	671965	679012	685913	692674	48 1
0 14	3 30	634447	642295	649971	657480	664830	672025	679070	685970	692729	46 1
0 16	4 0	4.634514	4.642360	4.650034	4.657542	4.664891	4.672084	4.679128	4.686027	4.692785	44 1
0 18	4 30	634580	642424	650097	657604	664951	672143	679186	686084	692841	42 1
0 20	5 0	634646	642489	650160	657666	665012	672203	679244	686140	692897	40 1
0 22	5 30	634712	642553	650223	657728	665072	672262	679302	686197	692952	38 1
0 24	6 0	4.634778	4.642618	4.650287	4.657790	4.665133	4.672321	4.679360	4.686254	4.693008	36 1
0 26	6 30	634844	642683	650350	657852	665193	672381	679418	686311	693064	34 1
0 28	7 0	634910	642747	650413	657913	665254	672440	679476	686368	693119	32 1
0 30	7 30	634976	642812	650476	657975	665314	672499	679534	686425	693175	30 1
0 32	8 0	4.635042	4.642876	4.650539	4.658037	4.665375	4.672558	4.679592	4.686482	4.693231	28 1
0 34	8 30	635108	642941	650603	658099	665435	672618	679650	686538	693286	26 1
0 36	9 0	635174	643006	650666	658161	665496	672677	679708	686595	693342	24 1
0 38	9 30	635240	643070	650729	658222	665556	672736	679766	686652	693398	22 1
0 40	10 0	4.635306	4.643135	4.650792	4.658284	4.665617	4.672795	4.679824	4.686709	4.693453	20 1
0 42	10 30	635372	643199	650855	658346	665677	672854	679882	686766	693509	18 1
0 44	11 0	635438	643264	650918	658408	665738	672913	679940	686822	693565	16 1
0 46	11 30	635504	643328	650981	658469	665798	672973	679998	686879	693620	14 1
0 48	12 0	4.635570	4.643393	4.651044	4.658531	4.665859	4.673032	4.680056	4.686936	4.693676	12 1
0 50	12 30	635636	643457	651107	658593	665919	673091	680114	686993	693731	10 1
0 52	13 0	635702	643521	651170	658655	665979	673150	680172	687049	693787	8 1
0 54	13 30	635768	643586	651234	658716	666040	673209	680230	687106	693843	6 1
0 56	14 0	4.635833	4.643650	4.651297	4.658778	4.666100	4.673268	4.680288	4.687163	4.693898	4 1
0 58	14 30	635899	643715	651360	658840	666160	673327	680345	687219	693954	2 1
1 0	15 0	635965	643779	651423	658901	666221	673387	680403	687276	694009	0 1
1 2	15 30	636031	643844	651486	658963	666281	673446	680461	687333	694065	58 0
1 4	16 0	4.636097	4.643908	4.651549	4.659025	4.666341	4.673505	4.680519	4.687389	4.694120	56 0
1 6	16 30	636163	643972	651612	659086	666402	673564	680577	687446	694176	54 0
1 8	17 0	636228	644037	651674	659148	666462	673623	680635	687503	694231	52 0
1 10	17 30	636294	644101	651737	659209	666522	673682	680693	687559	694287	50 0
1 12	18 0	4.636360	4.644165	4.651800	4.659271	4.666583	4.673741	4.680750	4.687616	4.694342	48 0
1 14	18 30	636426	644230	651863	659333	666643	673800	680808	687673	694398	46 0
1 16	19 0	636492	644294	651926	659394	666703	673859	680866	687729	694453	44 0
1 18	19 30	636557	644358	651989	659456	666764	673918	680924	687786	694509	42 0
1 20	20 0	4.636623	4.644423	4.652052	4.659517	4.666824	4.673977	4.680982	4.687842	4.694564	40 0
1 22	20 30	636689	644487	652115	659579	666884	674036	681039	687899	694620	38 0
1 24	21 0	636754	644551	652178	659640	666944	674095	681097	687956	694675	36 0
1 26	21 30	636820	644615	652241	659702	667004	674154	681155	688012	694730	34 0
1 28	22 0	4.636886	4.644680	4.652303	4.659763	4.667065	4.674213	4.681213	4.688069	4.694786	32 0
1 30	22 30	636951	644744	652366	659825	667125	674272	681270	688125	694841	30 0
1 32	23 0	637017	644808	652429	659886	667185	674331	681328	688182	694897	28 0
1 34	23 30	637083	644872	652492	659948	567245	674390	681386	688238	694952	26 0
1 36	24 0	4.637148	4.644936	4.652555	4.660009	4.667305	4.674448	4.681443	4.688295	4.695007	24 0
1 38	24 30	637214	645001	652618	660071	667366	674507	681501	688351	695063	22 0
1 40	25 0	637280	645065	652680	660132	667426	674566	681559	688408	695118	20 0
1 42	25 30	637345	645129	652743	660194	667486	674625	681616	688464	695173	18 0
1 44	26 0	4.637411	4.645193	4.652806	4.660255	4.667546	4.674684	4.681674	4.688521	4.695229	16 0
1 46	26 30	637476	645257	652869	660316	667606	674743	681732	688577	695284	14 0
1 48	27 0	637542	645321	652931	660378	667666	674802	681789	688634	695339	12 0
1 50	27 30	637607	645385	652994	660439	667726	674860	681847	688690	695395	10 0
1 52	28 0	4.637673	4.645450	4.653057	4.660500	4.667786	4.674919	4.681905	4.688747	4.695450	8 0
1 54	28 30	637739	645514	653119	660562	667846	674978	681962	688803	695505	6 0
1 56	29 0	637804	645578	653182	660623	667906	675037	682020	688859	695561	4 0
1 58	29 30	637870	645642	653245	660685	667966	675096	682077	688916	695616	2 0
2 0	30 0	4.637935	4.645706	4.653307	4.660746	4.668026	4.675155	4.682135	4.688972	4.695671	0 0
m s Time		34m	30m	26m	22m	18m	14m	10m	6m	2m	s m Time

20 Hours. 20 Hours.

3 Hours.		½ Log. Haversines.								3 Hours.
		26m	30m	34m	38m	42m	46m	50m	54m	58m	
Time m s	Arc. ′ ″	51° 30′	52° 30′	53° 30′	54° 30′	55° 30′	56° 30′	57° 30′	58° 30′	59° 30′	Time s m
0 0	30 0	4.637935	4.645706	4.653307	4.660746	4.668026	4.675155	4.682135	4.688972	4.695671	0 2
0 2	30 30	638000	645770	653370	660807	668086	675213	682192	689029	695726	58 1
0 4	31 0	638066	645834	653433	660868	668147	675272	682250	689085	695782	56 1
0 6	31 30	638131	645898	653495	660930	668207	675331	682308	689141	695837	54 1
0 8	32 0	4.638197	4.645962	4.653558	4.660991	4.668266	4.675390	4.682365	4.689198	4.695892	52 1
0 10	32 30	638262	646026	653621	661052	668326	675448	682423	689254	695947	50 1
0 12	33 0	638328	646090	653683	661114	668386	675507	682480	689310	696003	48 1
0 14	33 30	638393	646154	653746	661175	668446	675566	682538	689367	696058	46 1
0 16	34 0	4.638458	4.646218	4.653808	4.661236	4.668506	4.675624	4.682595	4.689423	4.696113	44 1
0 18	34 30	638524	646282	653871	661297	668566	675683	682653	689479	696168	42 1
0 20	35 0	638589	646346	653933	661359	668626	675742	682710	689536	696223	40 1
0 22	35 30	638655	646410	653996	661420	668686	675800	682768	689592	696278	38 1
0 24	36 0	4.638720	4.646473	4.654059	4.661481	4.668746	4.675859	4.682825	4.689648	4.696334	36 1
0 26	36 30	638785	646537	654121	661542	668806	675918	682882	689705	696389	34 1
0 28	37 0	638851	646601	654184	661603	668866	675976	682940	689761	696444	32 1
0 30	37 30	638916	646665	654246	661664	668926	676035	682997	689817	696499	30 1
0 32	38 0	4.638981	4.646729	4.654309	4.661726	4.668988	4.676094	4.683055	4.689873	4.696554	28 1
0 34	38 30	639046	646793	654371	661787	669045	676152	683112	689930	696609	26 1
0 36	39 0	639112	646857	654433	661848	669105	676211	683170	689986	696664	24 1
0 38	39 30	639177	646920	654496	661909	669165	676269	683227	690042	696719	22 1
0 40	40 0	4.639242	4.646984	4.654558	4.661970	4.669225	4.676328	4.683284	4.690098	4.696774	20 1
0 42	40 30	639307	647048	654621	662031	669285	676387	683342	690154	696830	18 1
0 44	41 0	639373	647112	654683	662092	669345	676445	683399	690211	696885	16 1
0 46	41 30	639438	647176	654746	662153	669404	676504	683456	690267	696940	14 1
0 48	42 0	4.639503	4.647239	4.654808	4.662214	4.669464	4.676562	4.683514	4.690323	4.696995	12 1
0 50	42 30	639568	647303	654870	662275	669524	676621	683571	690379	697050	10 1
0 52	43 0	639633	647367	654933	662337	669584	676679	683628	690435	697105	8 1
0 54	43 30	639698	647431	654995	662398	669643	676738	683686	690491	697160	6 1
0 56	44 0	4.639764	4.647494	4.655057	4.662459	4.669703	4.676796	4.683743	4.690548	4.697215	4 1
0 58	44 30	639829	647558	655120	662520	669763	676855	683800	690604	697270	2 1
1 0	45 0	639894	647622	655182	662581	669823	676913	683857	690660	697325	0 1
1 2	45 30	639959	647686	655244	662642	669882	676972	683915	690716	697380	58 0
1 4	46 0	4.640024	4.647749	4.655307	4.662703	4.669942	4.677030	4.683972	4.690772	4.697435	56 0
1 6	46 30	640089	647813	655369	662764	670002	677089	684029	690828	697490	54 0
1 8	47 0	640154	647877	655431	662824	670061	677147	684086	690884	697545	52 0
1 10	47 30	640219	647940	655494	662885	670121	677205	684144	690940	697600	50 0
1 12	48 0	4.640284	4.648004	4.655556	4.662946	4.670181	4.677264	4.684201	4.690996	4.697654	48 0
1 14	48 30	640349	648067	655618	663007	670240	677322	684258	691052	697709	46 0
1 16	49 0	640414	648131	655680	663068	670300	677381	684315	691108	697764	44 0
1 18	49 30	640479	648195	655743	663129	670360	677439	684373	691164	697819	42 0
1 20	50 0	4.640544	4.648258	4.655805	4.663190	4.670419	4.677497	4.684430	4.691220	4.697874	40 0
1 22	50 30	640609	648322	655867	663251	670479	677556	684487	691276	697929	38 0
1 24	51 0	640674	648385	655929	663312	670538	677614	684544	691332	697984	36 0
1 26	51 30	640739	648449	655991	663373	670598	677673	684601	691388	698039	34 0
1 28	52 0	4.640804	4.648512	4.656054	4.663433	4.670658	4.677731	4.684658	4.691444	4.698094	32 0
1 30	52 30	640869	648576	656116	663494	670717	677789	684715	691500	698148	30 0
1 32	53 0	640934	648639	656178	663555	670777	677848	684773	691556	698203	28 0
1 34	53 30	640999	648703	656240	663616	670836	677906	684830	691612	698258	26 0
1 36	54 0	4.641064	4.648766	4.656302	4.663677	4.670896	4.677964	4.684887	4.691668	4.698313	24 0
1 38	54 30	641129	648830	656364	663738	670955	678022	684944	691724	698368	22 0
1 40	55 0	641194	648893	656426	663798	671015	678081	685001	691780	698422	20 0
1 42	55 30	641259	648957	656488	663859	671074	678139	685058	691836	698477	18 0
1 44	56 0	4.641323	4.649020	4.656550	4.663920	4.671134	4.678197	4.685115	4.691892	4.698532	16 0
1 46	56 30	641388	649084	656613	663981	671193	678255	685172	691948	698587	14 0
1 48	57 0	641453	649147	656675	664041	671253	678314	685229	692004	698642	12 0
1 50	57 30	641518	649211	656737	664102	671312	678372	685286	692060	698696	10 0
1 52	58 0	4.641583	4.649274	4.656799	4.664163	4.671372	4.678430	4.685343	4.692115	4.698751	8 0
1 54	58 30	641648	649337	656861	664223	671431	678488	685400	692171	698806	6 0
1 56	59 0	641712	649401	656923	664284	671490	678546	685457	692227	698861	4 0
1 58	59 30	641777	649464	656985	664345	671550	678605	685514	692283	698915	2 0
2 0	60 0	4.641842	4.649527	4.657047	4.664406	4.671609	4.678663	4.685571	4.692339	4.698970	0 0
m s Time		32m	28m	24m	20m	16m	12m	8m	4m	0m	s m Time

4 HOURS. ½ LOG. HAVERSINES. 4 HOURS.

Time m	s	Arc. ′	0m 60°	4m 61°	8m 62°	12m 63°	16m 64°	20m 65°	24m 66°	28m 67°	32m 68°	Time s	m
0	0	0	4.698970	4.705469	4.711839	4.718085	4.724210	4.730216	4.736109	4.741889	4.747562	0	4
0	4	1	699079	705576	711944	718188	724311	730316	736206	741985	747655	56	3
0	8	2	699189	705683	712049	718291	724412	730415	736303	742080	747749	52	3
0	12	3	699298	705790	712155	718394	724513	730514	736400	742176	747842	48	3
0	16	4	4.699407	4.705897	4.712260	4.718497	4.724614	4.730613	4.736498	4.742271	4.747936	44	3
0	20	5	699517	706005	712364	718600	724715	730712	736595	742366	748029	40	3
0	24	6	699626	706112	712469	718703	724816	730811	736692	742462	748123	36	3
0	28	7	699735	706219	712574	718806	724916	730910	736789	742557	748216	32	3
0	32	8	4.699844	4.706326	4.712679	4.718909	4.725017	4.731009	4.736886	4.742652	4.748310	28	3
0	36	9	699953	706432	712784	719011	725118	731108	736983	742747	748403	24	3
0	40	10	700062	706539	712889	719114	725219	731206	737080	742842	748497	20	3
0	44	11	700171	706646	712994	719217	725320	731305	737177	742937	748590	16	3
0	48	12	4.700280	4.706753	4.713098	4.719320	4.725420	4.731404	4.737274	4.743032	4.748683	12	3
0	52	13	700389	706860	713203	719422	725521	731503	737371	743128	748777	8	3
0	56	14	700498	706967	713308	719525	725622	731601	737467	743223	748870	4	3
1	0	15	700607	707073	713412	719627	725722	731700	737564	743318	748963	0	3
1	4	16	4.700716	4.707180	4.713517	4.719730	4.725823	4.731799	4.737661	4.743413	4.749056	56	2
1	8	17	700825	707287	713621	719833	725923	731897	737758	743507	749149	52	2
1	12	18	700933	707393	713726	719935	726024	731996	737855	743602	749242	48	2
1	16	19	701042	707500	713830	720037	726124	732095	737951	743697	749336	44	2
1	20	20	4.701151	4.707606	4.713935	4.720140	4.726225	4.732193	4.738048	4.743792	4.749429	40	2
1	24	21	701259	707713	714039	720242	726325	732292	738145	743887	749522	36	2
1	28	22	701368	707819	714144	720345	726426	732390	738241	743982	749615	32	2
1	32	23	701477	707926	714248	720447	726526	732489	738338	744076	749708	28	2
1	36	24	4.701585	4.708032	4.714352	4.720549	4.726626	4.732587	4.738434	4.744171	4.749801	24	2
1	40	25	701694	708139	714457	720651	726727	732685	738531	744266	749894	20	2
1	44	26	701802	708245	714561	720754	726827	732784	738627	744361	749987	16	2
1	48	27	701911	708351	714665	720856	726927	732882	738724	744455	750079	12	2
1	52	28	5.702019	4.708457	4.714769	4.720958	4.727027	4.732980	4.738820	4.744550	4.750172	8	2
1	56	29	702127	708564	714873	721060	727127	733079	738916	744644	750265	4	2
2	0	30	702236	708670	714978	721162	727228	733177	739013	744739	750358	0	2
2	4	31	702344	708776	715082	721264	727328	733275	739109	744833	750451	56	1
2	8	32	4.702452	4.708882	4.715186	4.721366	4.727428	4.733373	4.739205	4.744928	4.750543	52	1
2	12	33	702560	708988	715290	721468	727528	733471	739302	745022	750636	48	1
2	16	34	702669	709094	715394	721570	727628	733569	739398	745117	750729	44	1
2	20	35	702777	709200	715498	721672	727728	733667	739494	745211	750821	40	1
2	24	36	4.702885	4.709306	4.715601	4.721774	4.727828	4.733765	4.739590	4.745306	4.750914	36	1
2	28	37	702993	709412	715705	721876	727928	733863	739686	745400	751007	32	1
2	32	38	703101	709518	715809	721978	728027	733961	739783	745494	751099	28	1
2	36	39	703209	709624	715913	722080	728127	734059	739879	745589	751192	24	1
2	40	40	4.703317	4.709730	4.716017	4.722181	4.728227	4.734157	4.739975	4.745683	4.751284	20	1
2	44	41	703425	709836	716120	722283	728327	734255	740071	745777	751377	16	1
2	48	42	703533	709941	716224	722385	728427	734353	740167	745871	751469	12	1
2	52	43	703641	710047	716328	722486	728526	734451	740263	745965	751561	8	1
2	56	44	4.703749	4.710153	4.716432	4.722588	4.728626	4.734548	4.740359	4.746059	4.751654	4	1
3	0	45	703856	710259	716535	722690	728726	734646	740455	746154	751746	0	1
3	4	46	703964	710364	716639	722791	728825	734744	740550	746248	751838	56	0
3	8	47	704072	710470	716742	722893	728925	734842	740646	746342	751931	52	0
3	12	48	4.704179	4.710575	4.716846	4.722994	4.729024	4.734939	4.740742	4.746436	4.752023	48	0
3	16	49	704287	710681	716949	723096	729124	735037	740838	746530	752115	44	0
3	20	50	704395	710786	717053	723197	729223	735134	740934	746624	752207	40	0
3	24	51	704502	710892	717156	723299	729323	735232	741029	746718	752300	36	0
3	28	52	4.704610	4.710997	4.717259	4.723400	4.729422	4.735330	4.741125	4.746811	4.752392	32	0
3	32	53	704717	711103	717363	723501	729522	735427	741221	746905	752484	28	0
3	36	54	704825	711208	717466	723603	729621	735525	741316	746999	752576	24	0
3	40	55	704932	711313	717569	723704	729720	735622	741412	747093	752668	20	0
3	44	56	4.705040	4.711419	4.717672	4.723805	4.729820	4.735719	4.741507	4.747187	4.752760	16	0
3	48	57	705147	711524	717776	723906	729919	735817	741603	747281	752852	12	0
3	52	58	705254	711629	717879	724007	730018	735914	741699	747374	752944	8	0
3	56	59	705362	711734	717982	724109	730117	736011	741794	747468	753036	4	0
4	0	60	4.705469	4.711839	4.718085	4.724210	4.730216	4.736109	4.741889	4.747562	4.753128	0	0
m.	s. Time		56m	52m	48m	44m	40m	36m	32m	28m	24m	s.	m. Time

19 HOURS. 19 HOURS.

4 Hours.		½ Log. Haversines.						5 Hours.			
		36m	40m	44m	48m	52m	56m	5h 0m	4m	8m	
Time m s	Arc. ′	69°	70°	71°	72°	73°	74°	75°	76°	77°	Time s m
0 0	0	4·753128	4·758591	4·763954	4·769219	4·774388	4·779463	4·784447	4·789342	4·794150	0 4
0 4	1	753220	758681	764043	769306	774473	779547	784529	789423	794229	56 3
0 8	2	753312	758772	764131	769392	774558	779631	784612	789504	794308	52 3
0 12	3	753404	758862	764220	769479	774644	779714	784694	789584	794388	48 3
0 16	4	4·753495	4·758952	4·764308	4·769566	4·774729	4·779798	4·784776	4·789665	4·794467	44 3
0 20	5	753587	759042	764396	769653	774814	779882	784858	789746	794546	40 3
0 24	6	753679	759132	764485	769740	774899	779965	784941	789827	794626	36 3
0 28	7	753771	759222	764573	769827	774984	780049	785023	789907	794705	32 3
0 32	8	4·753862	4·759312	4·764662	4·769913	4·775070	4·780133	4·785105	4·789988	4·794784	28 3
0 36	9	753954	759402	764750	770000	775155	780216	785187	790069	794863	24 3
0 40	10	754046	759492	764838	770087	775240	780300	785269	790149	794942	20 3
0 44	11	754137	759582	764926	770173	775325	780384	785351	790230	795022	16 3
0 48	12	4·754229	4·759672	4·765015	4·770260	4·775410	4·780467	4·785433	4·790310	4·795101	12 3
0 52	13	754320	759762	765103	770347	775495	780551	785515	790391	795180	8 3
0 56	14	754412	759851	765191	770433	775580	780634	785597	790471	795259	4 3
1 0	15	754503	759941	765279	770520	775665	780717	785679	790552	795338	0 3
1 4	16	4·754595	4·760031	4·765367	4·770606	4·775750	4·780801	4·785761	4·790632	4·795417	56 2
1 8	17	754686	760121	765455	770693	775835	780884	785843	790713	795496	52 2
1 12	18	754778	760211	765544	770779	775920	780968	785925	790793	795575	48 2
1 16	19	754869	760300	765632	770866	776005	781051	786007	790874	795654	44 2
1 20	20	4·754960	4·760390	4·765720	4·770952	4·776090	4·781134	4·786089	4·790954	4·795733	40 2
1 24	21	755052	760480	765808	771039	776174	781218	786170	791034	795812	36 2
1 28	22	755143	760569	765896	771125	776259	781301	786252	791115	795891	32 2
1 32	23	755234	760659	765984	771211	776344	781384	786334	791195	795970	28 2
1 36	24	4·755326	4·760748	4·766071	4·771298	4·776429	4·781467	4·786416	4·791275	4·796049	24 2
1 40	25	755417	760838	766159	771384	776514	781551	786497	791356	796127	20 2
1 44	26	755508	760927	766247	771470	776598	781634	786579	791436	796206	16 2
1 48	27	755599	761017	766335	771556	776683	781717	786661	791516	796285	12 2
1 52	28	4·755690	4·761106	4·766423	4·771643	4·776768	4·781800	4·786742	4·791596	4·796364	8 2
1 56	29	755781	761196	766511	771729	776852	781883	786824	791676	796442	4 2
2 0	30	755872	761285	766598	771815	776937	781966	786906	791757	796521	0 2
2 4	31	755963	761374	766686	771901	777021	782049	786987	791837	796600	56 1
2 8	32	4·756054	4·761464	4·766774	4·771987	4·777106	4·782132	4·787069	4·791917	4·796679	52 1
2 12	33	756145	761553	766862	772073	777190	782215	787150	791997	796757	48 1
2 16	34	756236	761642	766949	772159	777275	782298	787232	792077	796836	44 1
2 20	35	756327	761732	767037	772245	777359	782381	787313	792157	796914	40 1
2 24	36	4·756418	4·761821	4·767124	4·772331	4·777444	4·782464	4·787395	4·792237	4·796993	36 1
2 28	37	756509	761910	767212	772417	777528	782547	787476	792317	797072	32 1
2 32	38	756600	761999	767300	772503	777613	782630	787557	792397	797150	28 1
2 36	39	756691	762088	767387	772589	777697	782713	787639	792477	797229	24 1
2 40	40	4·756781	4·762177	4·767475	4·772675	4·777781	4·782796	4·787720	4·792557	4·797307	20 1
2 44	41	756872	762267	767562	772761	777866	782879	787801	792636	797386	16 1
2 48	42	756963	762356	767649	772847	777950	782961	787883	792716	797464	12 1
2 52	43	757054	762445	767737	772933	778034	783044	787964	792796	797542	8 1
2 56	44	4·757144	4·762534	4·767824	4·773018	4·778119	4·783127	4·788045	4·792876	4·797621	4 1
3 0	45	757235	762623	767912	773104	778203	783209	788126	792956	797699	0 1
3 4	46	757326	762712	767999	773190	778287	783292	788208	793035	797777	56 0
3 8	47	757416	762800	768086	773276	778371	783375	788289	793115	797856	52 0
3 12	48	4·757507	4·762889	4·768173	4·773361	4·778455	4·783457	4·788370	4·793195	4·797934	48 0
3 16	49	757597	762978	768261	773447	778539	783540	788451	793275	798012	44 0
3 20	50	757688	763067	768348	773533	778623	783623	788532	793354	798091	40 0
3 24	51	757778	763156	768435	773618	778708	783705	788613	793434	798169	36 0
3 28	52	4·757869	4·763245	4·768522	4·773704	4·778792	4·783788	4·788694	4·793513	4·798247	32 0
3 32	53	757959	763333	768609	773789	778876	783870	788775	793593	798325	28 0
3 36	54	758049	763422	768697	773875	778960	783953	788856	793673	798403	24 0
3 40	55	758140	763511	768784	773960	779044	784035	788937	793752	798481	20 0
3 44	56	4·758230	4·763600	4·768871	4·774046	4·779127	4·784118	4·789018	4·793832	4·798560	16 0
3 48	57	758320	763688	768958	774131	779211	784200	789099	793911	798638	12 0
3 52	58	758411	763777	769045	774217	779295	784282	789180	793991	798716	8 0
3 56	59	758501	763865	769132	774302	779379	784365	789261	794070	798794	4 0
4 0	60	4·758591	4·763954	4·769219	4·774388	4·779463	4·784447	4·789342	4·794150	4·798872	0 0
m s Time		20m	16m	12m	8m	4m	0m 19h	56m	52m	48m	s m Time

19 Hours. 18 Hours.

5 Hours. ½ Log. Haversines. 5 Hours.

Time m	s	Arc. ′	12m 78°	16m 79°	20m 80°	24m 81°	28m 82°	32m 83°	36m 84°	40m 85°	44m 86°	Time s	m
0	0	0	4.798872	4.803510	4.808067	4.812544	4.816943	4.821265	4.825511	4.829683	4.833783	0	4
0	4	1	798950	803587	808143	812618	817016	821336	825581	829752	833851	56	3
0	8	2	799028	803664	808218	812692	817088	821407	825651	829821	833919	52	3
0	12	3	799106	803740	808293	812766	817161	821479	825721	829890	833986	48	3
0	16	4	4.799184	4.803817	4.808368	4.812840	4.817233	4.821550	4.825791	4.829959	4.834054	44	3
0	20	5	799261	803893	808444	812914	817306	821621	825861	830028	834122	40	3
0	24	6	799339	803970	808519	812988	817378	821693	825931	830097	834189	36	3
0	28	7	799417	804046	808594	813062	817451	821764	826001	830165	834257	32	3
0	32	8	4.799495	4.804123	4.808669	4.813135	4.817523	4.821835	4.826071	4.830234	4.834325	28	3
0	36	9	799573	804199	808744	813209	817596	821906	826141	830303	834392	24	3
0	40	10	799651	804276	808819	813283	817668	821977	826211	830372	834460	20	3
0	44	11	799728	804352	808894	813357	817741	822049	826281	830440	834527	16	3
0	48	12	4.799806	4.804428	4.808969	4.813430	4.817813	4.822120	4.826351	4.830509	4.834595	12	3
0	52	13	799884	804505	809044	813504	817886	822191	826421	830578	834662	8	3
0	56	14	799962	804581	809119	813578	817958	822262	826491	830646	834730	4	3
1	0	15	800039	804657	809194	813651	818030	822333	826561	830715	834797	0	3
1	4	16	4.800117	4.804734	4.809269	4.813725	4.818103	4.822404	4.826631	4.830784	4.834865	56	2
1	8	17	800194	804810	809344	813799	818175	822475	826700	630852	834932	52	2
1	12	18	800272	804886	809419	813872	818247	822546	826770	830921	834999	48	2
1	16	19	800350	804962	809494	813946	818320	822617	826840	830989	835067	44	2
1	20	20	4.800427	4.805038	4.809569	4.814019	4.818392	4.822688	4.826910	4.831058	4.835134	40	2
1	24	21	800505	805115	809643	814093	818464	822759	826980	831126	835201	36	2
1	28	22	800582	805191	809718	814166	818536	822830	827049	831195	835269	32	2
1	32	23	800660	805267	809793	814240	818609	822901	827119	831263	835336	28	2
1	36	24	4.800737	4.805343	4.809868	4.814313	4.818681	4.822972	4.827189	4.831332	4.835403	24	2
1	40	25	800815	805419	809942	814387	818753	823043	827258	831400	835471	20	2
1	44	26	800892	805495	810017	814460	818825	823114	827328	831469	835538	16	2
1	48	27	800969	805571	810092	814533	818897	823185	827398	831537	835605	12	2
1	52	28	4.801047	4.805647	4.810167	4.814607	4.818969	4.823255	4.827467	4.831606	4.835672	8	2
1	56	29	801124	805723	810241	814680	819041	823326	827537	831674	835739	4	2
2	0	30	801201	805799	810316	814753	819113	823397	827606	831742	835807	0	2
2	4	31	801279	805875	810390	814827	819185	823468	827676	831811	835874	56	1
2	8	32	4.801356	4.805951	4.810465	4.814900	4.819257	4.823539	4.827745	4.831879	4.835941	52	1
2	12	33	801433	806027	810540	814973	819329	823609	827815	831947	836008	48	1
2	16	34	801511	806103	810614	815046	819401	823680	827884	832015	836075	44	1
2	20	35	801588	806179	810689	815120	819473	823751	827954	832084	836142	40	1
2	24	36	4.801665	4.806254	4.810763	4.815193	4.819545	4.823821	4.828023	4.832152	4.836209	36	1
2	28	37	801742	806330	810838	815266	819617	823892	828092	832220	836276	32	1
2	32	38	801819	806406	810912	815339	819689	823963	828162	832288	836343	28	1
2	36	39	801896	806482	810986	815412	819761	824033	828231	832356	836410	24	1
2	40	40	4.801973	4.806557	4.811061	4.815485	4.819832	4.824104	4.828301	4.832425	4.836477	20	1
2	44	41	802050	806633	811135	815558	819904	824174	828370	832493	836544	16	1
2	48	42	802128	806709	811210	815631	819976	824245	828439	832561	836611	12	1
2	52	43	802205	806785	811284	815704	820048	824315	828509	832629	836678	8	1
2	56	44	4.802282	4.806860	4.811358	4.815778	4.820120	4.824386	4.828578	4.832697	4.836745	4	1
3	0	45	802359	806936	811433	815851	820191	824456	828647	832765	836812	0	1
3	4	46	802435	807011	811507	815923	820263	824527	828716	832833	836878	56	0
3	8	47	802512	807087	811581	815996	820335	824597	828785	832901	836945	52	0
3	12	48	4.802589	4.807163	4.811655	4.816069	4.820406	4.824668	4.828855	4.832969	4.837012	48	0
3	16	49	802666	807238	811730	816142	820478	824738	828924	833037	837079	44	0
3	20	50	802743	807314	811804	816215	820550	824808	828993	833105	837146	40	0
3	24	51	802820	807389	811878	816288	820621	824879	829062	833173	837212	36	0
3	28	52	4.802897	4.807465	4.811952	4.816361	4.820693	4.824949	4.829131	4.833241	4.837279	32	0
3	32	53	802974	807540	812026	816434	820764	825019	829200	833309	837346	28	0
3	36	54	803050	807615	812100	816507	820836	825090	829269	833377	837412	24	0
3	40	55	803127	807691	812174	816579	820907	825160	829338	833444	837479	20	0
3	44	56	4.803204	4.807766	4.812248	4.816652	4.820979	4.825230	4.829407	4.833512	4.837546	16	0
3	48	57	803280	807842	812322	816725	821050	825300	829476	833580	837612	12	0
3	52	58	803357	807917	812396	816797	821122	825370	829545	833648	837679	8	0
3	56	59	803434	807992	812470	816870	821193	825441	829614	833716	837746	4	0
4	0	60	4.803510	4.808067	4.812544	4.816943	4.821265	4.825511	4.829683	4.833783	4.837812	0	0
m Time s			44m	40m	36m	32m	28m	24m	20m	16m	12m	s Time m	

18 Hours. 18 Hours.

5 Hours.					½ Log. Haversines.						6 Hours.	
		48m	52m	56m	6h 0m	4m	8m	12m	16m	20m		
Time m s	Arc. ′	87°	88°	89°	90°	91°	92°	93°	94°	95°	Time s m	
0 0	0	4.837812	4.841771	4.845662	4.849485	4.853242	4.856934	4.860562	4.864127	4.867631	0	4
0 4	1	837879	841837	845726	849548	853304	856995	860622	864186	867689	56	3
0 8	2	837945	841902	845790	849611	853366	857056	860682	864245	867747	52	3
0 12	3	838012	841967	845854	849674	8534.9	857117	860742	864304	867804	48	3
0 16	4	4.838078	4.842033	4.845919	4.849737	4.853490	4.857178	4.860802	4.864363	4.867862	44	3
0 20	5	838145	842098	845983	849801	853552	857239	860862	864422	867920	40	3
0 24	6	838211	842163	846047	849864	853614	857300	860921	864481	867978	36	3
0 28	7	838278	842229	846111	849927	853676	857361	860981	864539	868036	32	3
0 32	8	4.838344	4.842294	4.846175	4.849990	4.853738	4.857421	4.861041	4.864598	4.868093	28	3
0 36	9	838410	842359	846239	850053	853800	857482	861101	864657	868151	24	3
0 40	10	838477	842424	846304	850116	853862	857543	861161	864716	868209	20	3
0 44	11	838543	842490	846368	850179	853924	857604	861220	864774	868266	16	3
0 48	12	4.838610	4.842555	4.846432	4.850242	4.853986	4.857665	4.861280	4.864833	4.868324	12	3
0 52	13	838676	842620	846496	850305	854047	857726	861340	864892	868382	8	3
0 56	14	838742	842685	846560	850367	854109	857786	861400	864950	868440	4	3
1 0	15	838808	842750	846614	850430	854171	857847	861459	865009	868497	0	3
1 4	16	4.838875	4.842815	4.846688	4.850493	4.854233	4.857908	4.861519	4.865068	4.868555	56	2
1 8	17	838941	842880	846752	850556	854295	857968	861579	865126	868612	52	2
1 12	18	839007	842946	846816	850619	854356	858029	861638	865185	868670	48	2
1 16	19	839073	843011	846880	850682	854418	858090	861698	865243	868728	44	2
1 20	20	4.839140	4.843076	4.846944	4.850745	4.854480	4.858150	4.861758	4.865302	4.868785	40	2
1 24	21	839206	843141	847007	850807	854542	858211	861817	865361	868843	36	2
1 28	22	839272	843206	847071	850870	854603	858272	861877	865419	868900	32	2
1 32	23	839338	843271	847135	850933	854665	858332	861936	865478	868958	28	2
1 36	24	4.839404	4.843336	4.847199	4.850996	4.854727	4.858393	4.861996	4.865536	4.869015	24	2
1 40	25	839470	843401	847263	851058	854788	858453	862055	865595	869073	20	2
1 44	26	839536	843465	847327	851121	854850	858514	862115	865653	869130	16	2
1 48	27	839602	843530	847390	851184	854911	858575	862174	865712	869187	12	2
1 52	28	4.839668	4.843595	4.847454	4.851246	4.854973	4.858635	4.862234	4.865770	4.869245	8	2
1 56	29	839734	843660	847518	851309	855035	858696	862293	865828	869302	4	2
2 0	30	839800	843725	847582	851372	855096	858756	862353	865887	869360	0	2
2 4	31	839866	843790	847645	851434	855158	858816	862412	865945	869417	56	1
2 8	32	4.839932	4.843855	4.847709	4.851497	4.855219	4.858877	4.862471	4.866004	4.869474	52	1
2 12	33	839998	843919	847773	851559	855281	858937	862531	866062	869532	48	1
2 16	34	840064	843984	847836	851622	855342	858998	862590	866120	869589	44	1
2 20	35	840130	844049	847900	851685	855404	859058	862649	866179	869646	40	1
2 24	36	4.840196	4.844114	4.847964	4.851747	4.855465	4.859119	4.862709	4.866237	4.869704	36	1
2 28	37	840262	844178	848027	851810	855526	859179	862768	866295	869761	32	1
2 32	38	840328	844243	848091	851872	855588	859239	862827	866353	869818	28	1
2 36	39	840393	844308	848154	851934	855649	859300	862887	866412	869875	24	1
2 40	40	4.840459	4.844372	4.848218	4.851997	4.855711	4.859360	4.862946	4.866470	4.869933	20	1
2 44	41	840525	844437	848281	852059	855772	859420	863005	866528	869990	16	1
2 48	42	840591	844502	848345	852122	855833	859480	863064	866586	870047	12	1
2 52	43	840656	844566	848408	852184	855894	859541	863124	866644	870104	8	1
2 56	44	4.840722	4.844631	4.848472	4.852247	4.855956	4.859601	4.863183	4.866703	4.870161	4	1
3 0	45	840788	844695	848535	852309	856017	859661	863242	866761	870218	0	1
3 4	46	840854	844760	848599	852371	856078	859721	863301	866819	870276	56	0
3 8	47	840919	844825	848662	852434	856140	859781	863360	866877	870333	52	0
3 12	48	4.840985	4.844889	4.848726	4.852496	4.856201	4.859842	4.863419	4.866935	4.870390	48	0
3 16	49	841051	844954	848789	852558	856262	859902	863478	866993	870447	44	0
3 20	50	841116	845018	848852	852620	856323	859962	863538	867051	870504	40	0
3 24	51	841182	845082	848916	852683	856384	860022	863597	867109	870561	36	0
3 28	52	4.841247	4.845147	4.848979	4.852745	4.856445	4.860082	4.863656	4.867167	4.870618	32	0
3 32	53	841313	845211	849042	852807	856507	860142	863715	867225	870675	28	0
3 36	54	841378	845276	849106	852869	856568	860202	863774	867283	870732	24	0
3 40	55	841444	845340	849169	852931	856630	860262	863833	867341	870789	20	0
3 44	56	4.841509	4.845404	4.849232	4.852994	4.856690	4.860322	4.863892	4.867399	4.870846	16	0
3 48	57	841575	845469	849295	853056	856751	860382	863951	867457	870903	12	0
3 52	58	841640	845533	849359	853118	856812	860442	864010	867515	870960	8	0
3 56	59	841706	845597	849422	853180	856873	860502	864069	867573	871017	4	0
4 0	60	4.841771	4.845662	4.849485	4.853242	4.856934	4.860562	4.864127	4.867631	4.871073	0	0
s m Time		8m	4m	0m 18h	56m	52m	48m	44m	40m	36m	s m Time	

18 Hours. 17 Hours.

6 Hours. ½ Log. Haversines. 6 Hours.

Time m s	Arc. ′	24m	28m	32m	36m	40m	44m	48m	52m	56m	Time s m
		96°	97°	98°	99°	100°	101°	102°	103°	104°	
0 0	0	4.871073	4.874456	4.877780	4.881045	4.884254	4.887406	4.890503	4.893544	4.896532	0 4
0 4	1	871130	874512	877835	881099	884307	887458	890554	893595	896581	56 3
0 8	2	871187	874568	877890	881153	884360	887510	890605	893645	896631	52 3
0 12	3	871244	874624	877944	881207	884413	887562	890656	893695	896680	48 3
0 16	4	4.871301	4.874680	4.877999	4.881261	4.884466	4.887614	4.890707	4.893745	4.896729	44 3
0 20	5	871358	874735	878054	881315	884519	887666	890758	893795	896779	40 3
0 24	6	871414	874791	878109	881369	884572	887718	890809	893846	896828	36 3
0 28	7	871471	874847	878164	881423	884625	887770	890860	893896	896877	32 3
0 32	8	4.871528	4.874903	4.878219	4.881477	4.884677	4.887822	4.890911	4.893946	4.896926	28 3
0 36	9	871585	874958	878273	881530	884730	887874	890962	893996	896976	24 3
0 40	10	871641	875014	878328	881584	884783	887926	891013	894046	897025	20 3
0 44	11	871698	875070	878383	881638	884836	887978	891064	894096	897074	16 3
0 48	12	4.871755	4.875126	4.878438	4.881692	4.884889	4.888030	4.891115	4.894146	4.897123	12 3
0 52	13	871811	875181	878492	881745	884942	888082	891166	894196	897172	8 3
0 56	14	871868	875237	878547	881799	884994	888133	891217	894246	897222	4 3
1 0	15	871925	875293	878602	881853	885047	888185	891268	894296	897271	0 3
1 4	16	4.871981	4.875348	4.878656	4.881907	4.885100	4.888237	4.891319	4.894346	4.897320	56 2
1 8	17	872038	875404	878711	881960	885153	888289	891370	894396	897369	52 2
1 12	18	872094	875459	878766	882014	885205	888341	891421	894446	897418	48 2
1 16	19	872151	875515	878820	882068	885258	888393	891472	894496	897467	44 2
1 20	20	4.872208	4.875571	4.878875	4.882121	4.885311	4.888444	4.891523	4.894546	4.897516	40 2
1 24	21	872264	875626	878929	882175	885364	888496	891573	894596	897565	36 2
1 28	22	872321	875682	878984	882228	885416	888548	891624	894646	897614	32 2
1 32	23	872377	875737	879038	882282	885469	888600	891675	894696	897663	28 2
1 36	24	4.872434	4.875793	4.879093	4.882336	4.885521	4.888651	4.891726	4.894746	4.897712	24 2
1 40	25	872490	875848	879148	882389	885574	888703	891777	894796	897761	20 2
1 44	26	872547	875904	879202	882443	885627	888755	891827	894846	897810	16 2
1 48	27	872603	875959	879256	882496	885679	888806	891878	894895	897859	12 2
1 52	28	4.872659	4.876014	4.879311	4.882550	4.885732	4.888858	4.891929	4.894945	4.897908	8 2
1 56	29	872716	876070	879365	882603	885784	888910	891980	894995	897957	4 2
2 0	30	872772	876125	879420	882657	885837	888961	892030	895045	898006	0 2
2 4	31	872829	876181	879474	882710	885889	889013	892081	895095	898055	56 1
2 8	32	4.872885	4.876236	4.879529	4.882764	4.885942	4.889064	4.892132	4.895144	4.898104	52 1
2 12	33	872941	876291	879583	882817	885994	889116	892182	895194	898153	48 1
2 16	34	872998	876347	879637	882871	886047	889167	892233	895244	898201	44 1
2 20	35	873054	876402	879692	882924	886099	889219	892284	895294	898250	40 1
2 24	36	4.873110	4.876457	4.879746	4.882977	4.886152	4.889271	4.892334	4.895343	4.898299	36 1
2 28	37	873166	876513	879800	883031	886204	889322	892385	895393	898348	32 1
2 32	38	873223	876568	879855	883084	886257	889374	892435	895443	898397	28 1
2 36	39	873279	876623	879909	883137	886309	889425	892486	895492	898446	24 1
2 40	40	4.873335	4.876678	4.879963	4.883191	4.886362	4.889476	4.892536	4.895542	4.898494	20 1
2 44	41	873391	876734	880018	883244	886414	889528	892587	895592	898543	16 1
2 48	42	873448	876789	880072	883297	886466	889579	892637	895641	898592	12 1
2 52	43	873504	876844	880126	883351	886519	889631	892688	895691	898641	8 1
2 56	44	4.873560	4.876899	4.880180	4.883404	4.886571	4.889682	4.892738	4.895741	4.898689	4 1
3 0	45	873616	876954	880234	883457	886623	889734	892789	895790	898738	0 1
3 4	46	873672	877010	880289	883510	886676	889785	892839	895840	898787	56 0
3 8	47	873728	877065	880343	883564	886728	889836	892890	895889	898835	52 0
3 12	48	4.873784	4.877120	4.880397	4.883617	4.886780	4.889888	4.892940	4.895939	4.898884	48 0
3 16	49	873840	877175	880451	883670	886832	889939	892991	895988	898933	44 0
3 20	50	873896	877230	880505	883723	886885	889990	893041	896038	898981	40 0
3 24	51	873952	877285	880559	883776	886937	890042	893092	896087	899030	36 0
3 28	52	4.874008	4.877340	4.880613	4.883829	4.886989	4.890093	4.893142	4.896137	4.899078	32 0
3 32	53	874065	877395	880667	883883	887041	890144	893192	896186	899127	28 0
3 36	54	874120	877450	880721	883936	887093	890195	893243	896236	899176	24 0
3 40	55	874176	877505	880776	883989	887145	890247	893293	896285	899224	20 0
3 44	56	4.874232	4.877560	4.880830	4.884042	4.887198	4.890298	4.893343	4.896335	4.899273	16 0
3 48	57	874288	877615	880884	884095	887250	890349	893394	896384	899321	12 0
3 52	58	874344	877670	880938	884148	887302	890400	893444	896433	899370	8 0
3 56	59	874400	877725	880992	884201	887354	890451	893494	896483	899418	4 0
4 0	60	4.874456	4.877780	4.881045	4.884254	4.887406	4.890503	4.893544	4.896532	4.899467	0 0
m s Time		32m	28m	24m	20m	16m	12m	8m	4m	0m 17h	s m Time

17 Hours. 17 Hours.

7 Hours. ½ Log. Haversines. 7 Hours.

Time m s	Arc. ′	0m 105°	4m 106°	8m 107°	12m 108°	16m 109°	20m 110°	24m 111°	28m 112°	32m 113°	Time s m
0 0	0	4.899467	4.902349	4.905179	4.907958	4.910686	4.913364	4.915994	4.918574	4.921107	0 4
0 4	1	899515	902396	905225	908003	910731	913409	916037	918617	921148	56 3
0 8	2	899564	902444	905272	908049	910776	913453	916080	918659	921190	52 3
0 12	3	899612	902491	905319	908095	910821	913497	916124	918702	921232	48 3
0 16	4	4.899660	4.902539	4.905366	4.908141	4.910866	4.913541	4.916167	4.918744	4.921274	44 3
0 20	5	899709	902586	905412	908187	910911	913585	916211	918787	921315	40 3
0 24	6	899757	902634	905459	908233	910956	913630	916254	918830	921357	36 3
0 28	7	899806	902681	905506	908278	911001	913674	916297	918872	921399	32 3
0 32	8	4.899854	4.902729	4.905552	4.908324	4.911046	4.913718	4.916341	4.918915	4.921441	28 3
0 36	9	899902	902776	905599	908370	911091	913762	916384	918957	921482	24 3
0 40	10	899951	902824	905645	908416	911136	913806	916427	919000	921524	20 3
0 44	11	899999	902871	905692	908462	911181	913850	916470	919042	921566	16 3
0 48	12	4.900047	4.902919	4.905739	4.908507	4.911226	4.913894	4.916514	4.919084	4.921607	12 3
0 52	13	900095	902966	905785	908553	911271	913938	916557	919127	921649	8 3
0 56	14	900144	903014	905832	908599	911315	913982	916600	919169	921691	4 3
1 0	15	900192	903061	905878	908644	911360	914026	916643	919212	921732	0 3
1 4	16	4.900240	4.903108	4.905925	4.908690	4.911405	4.914070	4.916687	4.919254	4.921774	56 2
1 8	17	900288	903156	905971	908736	911450	914114	916730	919297	921815	52 2
1 12	18	900337	903203	906018	908781	911495	914158	916773	919339	921857	48 2
1 16	19	900385	903250	906064	908827	911540	914202	916816	919381	921899	44 2
1 20	20	4.900433	4.903298	4.906111	4.908873	4.911584	4.914246	4.916859	4.919424	4.921940	40 2
1 24	21	900481	903345	906157	908918	911629	914290	916902	919466	921982	36 2
1 28	22	900529	903392	906204	908964	911674	914334	916945	919508	922023	32 2
1 32	23	900578	903440	906250	909009	911719	914378	916989	919551	922065	28 2
1 36	24	4.900626	4.903487	4.906296	4.909055	4.911763	4.914422	4.917032	4.919593	4.922106	24 2
1 40	25	900674	903534	906343	909101	911808	914466	917075	919635	922148	20 2
1 44	26	900722	903581	906389	909146	911853	914510	917118	919677	922189	16 2
1 48	27	900770	903628	906435	909192	911897	914554	917161	919720	922231	12 2
1 52	28	4.900818	4.903676	4.906482	4.909237	4.911942	4.914598	4.917204	4.919762	4.922272	8 2
1 56	29	900866	903723	906528	909283	911987	914641	917247	919804	922313	4 2
2 0	30	900914	903770	906574	909328	912031	914685	917290	919846	922355	0 2
2 4	31	900962	903817	906621	909374	912076	914729	917333	919889	922396	56 1
2 8	32	4.901010	4.903864	4.906667	4.909419	4.912121	4.914773	4.917376	4.919931	4.922438	52 1
2 12	33	901058	903911	906713	909464	912165	914817	917419	919973	922479	48 1
2 16	34	901106	903959	906760	909510	912210	914860	917462	920015	922520	44 1
2 20	35	901154	904006	906806	909555	912254	914904	917505	920057	922562	40 1
2 24	36	4.901202	4.904053	4.906852	4.909601	4.912299	4.914948	4.917548	4.920099	4.922603	36 1
2 28	37	901250	904100	906898	909646	912344	914992	917591	920141	922644	32 1
2 32	38	901298	904147	906945	909691	912388	915035	917634	920184	922686	28 1
2 36	39	901346	904194	906991	909737	912433	915079	917676	920226	922727	24 1
2 40	40	4.901394	4.904241	4.907037	4.909782	4.912477	4.915123	4.917719	4.920268	4.922768	20 1
2 44	41	901442	904288	907083	909827	912522	915166	917762	920310	922810	16 1
2 48	42	901489	904335	907129	909873	912566	915210	917805	920352	922851	12 1
2 52	43	901537	904382	907175	909918	912611	915254	917848	920394	922892	8 1
2 56	44	4.901585	4.904429	4.907222	4.909963	4.912655	4.915297	4.917891	4.920437	4.922933	4 1
3 0	45	901633	904476	907268	910009	912699	915341	917934	920478	922975	0 1
3 4	46	901681	904523	907314	910054	912744	915385	917976	920520	923016	56 0
3 8	47	901729	904570	907360	910099	912788	915428	918019	920562	923057	52 0
3 12	48	4.901776	4.904617	4.907406	4.910144	4.912833	4.915472	4.918062	4.920604	4.923098	48 0
3 16	49	901824	904664	907452	910190	912877	915515	918105	920646	923139	44 0
3 20	50	901872	904711	907498	910235	912921	915559	918147	920688	923180	40 0
3 24	51	901920	904757	907544	910280	912966	915602	918190	920730	923222	36 0
3 28	52	4.901967	4.904804	4.907590	4.910325	4.913010	4.915646	4.918233	4.920772	4.923263	32 0
3 32	53	902015	904851	907636	910370	913055	915689	918276	920814	923304	28 0
3 36	54	902063	904898	907682	910415	913099	915733	918318	920855	923345	24 0
3 40	55	902110	904945	907728	910461	913143	915776	918361	920897	923386	20 0
3 44	56	4.902158	4.904992	4.907774	4.910506	4.913187	4.915820	4.918404	4.920939	4.923427	16 0
3 48	57	902206	905038	907820	910551	913232	915863	918446	920981	923468	12 0
3 52	58	902253	905085	907866	910596	913276	915907	918489	921023	923509	8 0
3 56	59	902301	905132	907912	910641	913320	915950	918532	921065	923550	4 0
4 0	60	4.902349	4.905179	4.907958	4.910686	4.913364	4.915994	4.918574	4.921107	4.923591	0 0
m s Time		56m	52m	48m	44m	40m	36m	32m	28m	24m	s m Time

16 Hours. 16 Hours.

7 HOURS. ½ LOG. HAVERSINES. 8 HOURS.

Time m	s	Arc. ′	36m	40m	44m	48m	52m	56m	8h 0m	4m	8m	Time s	m
			114°	115°	116°	117°	118°	119°	120°	121°	122°		
0	0	0	4.923591	4.926029	4.928420	4.930766	4.933066	4.935320	4.937531	4.939697	4.941819	0	4
0	4	1	923632	926069	928460	930804	933103	935358	937567	939732	941854	56	3
0	8	2	923673	926110	928499	930843	933141	935395	937603	939768	941889	52	3
0	12	3	923714	926150	928539	930882	933179	935432	937640	939804	941924	48	3
0	16	4	4.923755	4.926190	4.928578	4.930920	4.933217	4.935469	4.937676	4.939840	4.941959	44	3
0	20	5	923796	926230	928618	930959	933255	935506	937713	939875	941994	40	3
0	24	6	923837	926270	928657	930998	933293	935543	937749	939911	942029	36	3
0	28	7	923878	926311	928696	931036	933331	935580	937786	939947	942064	32	3
0	32	8	4.923919	4.926351	4.928736	4.931075	4.933369	4.935618	4.937822	4.939982	4.942099	28	3
0	36	9	923960	926391	928775	931114	933407	935655	937858	940018	942134	24	3
0	40	10	924001	926431	928814	931152	933444	935692	937895	940053	942169	20	3
0	44	11	924042	926471	928854	931191	933482	935729	937931	940089	942204	16	3
0	48	12	4.924083	4.926511	4.928893	4.931229	4.933520	4.935766	4.937967	4.940125	4.942239	12	3
0	52	13	924124	926551	928932	931268	933558	935803	938004	940160	942273	8	3
0	56	14	924164	926591	928972	931306	933596	935840	938040	940196	942308	4	3
1	0	15	924205	926631	929011	931345	933633	935877	938076	940231	942343	0	3
1	4	16	4.924246	4.926671	4.929050	4.931383	4.933671	4.935914	4.938113	4.940267	4.942378	56	2
1	8	17	924287	926711	929090	931422	933709	935951	938149	940303	942413	52	2
1	12	18	924328	926751	929129	931460	933747	935988	938185	940338	942448	48	2
1	16	19	924368	926791	929168	931499	933784	936025	938221	940374	942482	44	2
1	20	20	4.924409	4.926831	4.929207	4.931537	4.933822	4.936062	4.938258	4.940409	4.942517	40	2
1	24	21	924450	926871	929246	931576	933860	936099	938294	940445	942552	36	2
1	28	22	924491	926911	929286	931614	933898	936136	938330	940480	942587	32	2
1	32	23	924531	926951	929325	931653	933935	936173	938366	940515	942621	28	2
1	36	24	4.924572	4.926991	4.929364	4.931691	4.933973	4.936210	4.938402	4.940551	4.942656	24	2
1	40	25	924613	927031	929403	931729	934010	936247	938438	940586	942691	20	2
1	44	26	924653	927071	929442	931768	934048	936284	938475	940622	942725	16	2
1	48	27	924694	927111	929481	931806	934086	936320	938511	940657	942760	12	2
1	52	28	4.924735	4.927151	4.929521	4.931845	4.934123	4.936357	4.938547	4.940693	4.942795	8	2
1	56	29	924775	927191	929560	931883	934161	936394	938583	940728	942830	4	2
2	0	30	924816	927231	929599	931921	934199	936431	938619	940763	942864	0	2
2	4	31	924857	927270	929638	931960	934236	936468	938655	940799	942899	56	1
2	8	32	4.924897	4.927310	4.929677	4.931998	4.934274	4.936505	4.938691	4.940834	4.942933	52	1
2	12	33	924938	927350	929716	932036	934311	936541	938727	940869	942968	48	1
2	16	34	924979	927390	929755	932075	934349	936578	938763	940905	943003	44	1
2	20	35	925019	927430	929794	932113	934386	936615	938799	940940	943037	40	1
2	24	36	4.925060	4.927469	4.929833	4.932151	4.934424	4.936652	4.938836	4.940975	4.943072	36	1
2	28	37	925100	927509	929872	932189	934461	936689	938872	941011	943106	32	1
2	32	38	925141	927549	929911	932228	934499	936725	938908	941046	943141	28	1
2	36	39	925181	927589	929950	932266	934536	936762	938944	941081	943176	24	1
2	40	40	4.925222	4.927628	4.929989	4.932304	4.934574	4.936799	4.938980	4.941117	4.943210	20	1
2	44	41	925262	927668	930028	932342	934611	936835	939016	941152	943245	16	1
2	48	42	925303	927708	930067	932380	934649	936872	939051	941187	943279	12	1
2	52	43	925343	927748	930106	932419	934686	936909	939087	941222	943314	8	1
2	56	44	4.925384	4.927787	4.930145	4.932457	4.934723	4.936946	4.939123	4.941257	4.943348	4	1
3	0	45	925424	927827	930184	932495	934761	936982	939159	941293	943383	0	1
3	4	46	925465	927867	930223	932533	934798	937019	939195	941328	943417	56	0
3	8	47	925505	927906	930261	932571	934836	937055	939231	941363	943452	52	0
3	12	48	4.925545	4.927946	4.930300	4.932609	4.934873	4.937092	4.939267	4.941398	4.943486	48	0
3	16	49	925586	927985	930339	932647	934910	937129	939303	941433	943520	44	0
3	20	50	925626	928025	930378	932685	934948	937165	939339	941468	943555	40	0
3	24	51	925666	928065	930417	932723	934985	937202	939375	941504	943589	36	0
3	28	52	4.925707	4.928104	4.930456	4.932762	4.935022	4.937238	4.939410	4.941539	4.943624	32	0
3	32	53	925747	928144	930494	932800	935060	937275	939446	941574	943658	28	0
3	36	54	925787	928183	930533	932838	935097	937312	939482	941609	943692	24	0
3	40	55	925828	928223	930572	932876	935134	937348	939518	941644	943727	20	0
3	44	56	4.925868	4.928262	4.930611	4.932914	4.935171	4.937385	4.939554	4.941679	4.943761	16	0
3	48	57	925908	928302	930650	932953	935209	937421	939589	941714	943796	12	0
3	52	58	925949	928341	930688	932990	935246	937458	939625	941749	943830	8	0
3	56	59	925989	928381	930727	933028	935283	937494	939661	941784	943864	4	0
4	0	60	4.926029	4.928420	4.930766	4.933066	4.935320	4.937531	4.939697	4.941819	4.943898	0	0
m Time	s		20m	16m	12m	8m	4m	0m 16h	56m	52m	48m	s Time	m

16 HOURS. 15 HOURS.

8 Hours. ½ Log. Haversines. 8 Hours.

Time m s	Arc. ′	12m 123°	16m 124°	20m 125°	24m 126°	28m 127°	32m 128°	36m 129°	40m 130°	44m 131°	Time s m
0 0	0	4.943898	4.945935	4.947929	4.949881	4.951791	4.953660	4.955488	4.957276	4.959023	0 4
0 4	1	943933	945968	947962	949913	951823	953691	955518	957305	959052	56 3
0 8	2	943967	946002	947995	949945	951854	953722	955548	957335	959080	52 3
0 12	3	944001	946036	948027	949977	951886	953753	955579	957364	959109	48 3
0 16	4	4.944036	4.946069	4.948060	4.950009	4.951917	4.953783	4.955609	4.957393	4.959138	44 3
0 20	5	944070	946103	948093	950042	951948	953814	955639	957423	959167	40 3
0 24	6	944104	946136	948126	950074	951980	953845	955669	957452	959195	36 3
0 28	7	944138	946170	948159	950106	952011	953876	955699	957482	959224	32 3
0 32	8	4.944172	4.946203	4.948192	4.950138	4.952043	4.953906	4.955729	4.957511	4.959253	28 3
0 36	9	944207	946237	948224	950170	952074	953937	955759	957540	959281	24 3
0 40	10	944241	946270	948257	950202	952105	953968	955789	957570	959310	20 3
0 44	11	944275	946304	948290	950234	952137	953998	955819	957599	959339	16 3
0 48	12	4.944309	4.946337	4.948323	4.950266	4.952168	4.954029	4.955849	4.957628	4.959367	12 3
0 52	13	944343	946370	948355	950298	952200	954060	955879	957658	959396	8 3
0 56	14	944377	946404	948388	950330	952231	954090	955909	957687	959425	4 3
1 0	15	944412	946437	948421	950362	952262	954121	955939	957716	959453	0 3
1 4	16	4.944446	4.946471	4.948453	4.950394	4.952294	4.954152	4.955969	4.957746	4.959482	56 2
1 8	17	944480	946504	948486	950426	952325	954182	955999	957775	959511	52 2
1 12	18	944514	946538	948519	950458	952356	954213	956029	957804	959539	48 2
1 16	19	944548	946571	948552	950490	952387	954243	956059	957833	959568	44 2
1 20	20	4.944582	4.946604	4.948584	4.950522	4.952419	4.954274	4.956089	4.957863	4.959596	40 2
1 24	21	944616	946638	948617	950554	952450	954305	956118	957892	959625	36 2
1 28	22	944650	946671	948649	950586	952481	954335	956148	957921	959653	32 2
1 32	23	944684	946704	948682	950618	952512	954366	956178	957950	959682	28 2
1 36	24	4.944718	4.946738	4.948715	4.950650	4.952544	4.954396	4.956208	4.957979	4.959711	24 2
1 40	25	944752	946771	948747	950682	952575	954427	956238	958009	959739	20 2
1 44	26	944786	946804	948780	950714	952606	954457	956268	958038	959768	16 2
1 48	27	944820	946837	948812	950746	952637	954488	956298	958067	959796	12 2
1 52	28	4.944854	4.946871	4.948845	4.950777	4.952668	4.954518	4.956327	4.958096	4.959825	8 2
1 56	29	944888	946904	948878	950809	952700	954549	956357	958125	959853	4 2
2 0	30	944922	946937	948910	950841	952731	954579	956387	958154	959881	0 2
2 4	31	944956	946970	948943	950873	952762	954610	956417	958183	959910	56 1
2 8	32	4.944990	4.947004	4.948975	4.950905	4.952793	4.954640	4.956447	4.958212	4.959938	52 1
2 12	33	945024	947037	949008	950937	952824	954671	956476	958242	959967	48 1
2 16	34	945058	947070	949040	950968	952855	954701	956506	958271	959995	44 1
2 20	35	945092	947103	949073	951000	952886	954731	956536	958300	960024	40 1
2 24	36	4.945125	4.947136	4.949105	4.951032	4.952917	4.954762	4.956566	4.958329	4.960052	36 1
2 28	37	945159	947169	949138	951064	952949	954792	956595	958358	960080	32 1
2 32	38	945193	947203	949170	951096	952980	954823	956625	958387	960109	28 1
2 36	39	945227	947236	949202	951127	953011	954853	956655	958416	960137	24 1
2 40	40	4.945261	4.947269	4.949235	4.951159	4.953042	4.954883	4.956684	4.958445	4.960165	20 1
2 44	41	945295	947302	949267	951191	953073	954914	956714	958474	960194	16 1
2 48	42	945328	947335	949300	951222	953104	954944	956744	958503	960222	12 1
2 52	43	945362	947368	949332	951254	953135	954974	956773	958532	960250	8 1
2 56	44	4.945396	4.947401	4.949364	4.951286	4.953166	4.955005	4.956803	4.958561	4.960279	4 1
3 0	45	945430	947434	949397	951317	953197	955035	956833	958590	960307	0 1
3 4	46	945464	947467	949429	951349	953228	955065	956862	958619	960335	56 0
3 8	47	945497	947500	949461	951381	953259	955096	956892	958648	960364	52 0
3 12	48	4.945531	4.947533	4.949494	4.951412	4.953290	4.955126	4.956921	4.958677	4.960392	48 0
3 16	49	945565	947566	949526	951444	953321	955156	956951	958706	960420	44 0
3 20	50	945598	947600	949558	951476	953351	955186	956981	958734	960448	40 0
3 24	51	945632	947632	949591	951507	953382	955217	957010	958763	960477	36 0
3 28	52	4.945666	4.947665	4.949623	4.951539	4.953413	4.955247	4.957040	4.958792	4.960505	32 0
3 32	53	945699	947698	949655	951570	953444	955277	957069	958821	960533	28 0
3 36	54	945733	947731	949688	951602	953475	955307	957099	958850	960561	24 0
3 40	55	945767	947764	949720	951634	953506	955337	957128	958879	960589	20 0
3 44	56	4.945800	4.947797	4.949752	4.951665	4.953537	4.955368	4.957158	4.958908	4.960618	16 0
3 48	57	945834	947830	949784	951697	953568	955398	957187	958936	960646	12 0
3 52	58	945868	947863	949816	951728	953598	955428	957217	958965	960674	8 0
3 56	59	945901	947896	949849	951760	953629	955458	957246	958994	960702	4 0
4 0	60	4.945935	4.947929	4.949881	4.951791	4.953660	4.955488	4.957276	4.959023	4.960730	0 0
m s Time		44m	40m	36m	32m	28m	24m	20m	16m	12m	s m Time

15 Hours. 15 Hours.

8 HOURS. ½ LOG. HAVERSINES. 9 HOURS.

Time m s	Arc. ′	48m 132°	52m 133°	56m 134°	9h 0m 135°	4m 136°	8m 137°	12m 138°	16m 139°	Arc. ′	Time s m
0 0	0	4.960730	4.962398	4.964026	4.965615	4.967166	4.968678	4.970152	4.971588	60	0 4
0 4	1	960758	962425	964053	965641	967191	968703	970176	971611	59	56 3
0 8	2	960786	962453	964080	965668	967217	968728	970200	971635	58	52 3
0 12	3	960814	962480	964106	965694	967242	968752	970224	971658	57	48 3
0 16	4	4.960843	4.962508	4.964133	4.965720	4.967268	4.968777	4.970249	4.971682	56	44 3
0 20	5	960871	962535	964160	965746	967293	968802	970273	971706	55	40 3
0 24	6	960899	962562	964187	965772	967319	968827	970297	971729	54	36 3
0 28	7	960927	962590	964213	965798	967344	968852	970321	971753	53	32 3
0 32	8	4.960955	4.962617	4.964240	4.965824	4.967370	4.968877	4.970345	4.971776	52	28 3
0 36	9	960983	962644	964267	965850	967395	968901	970369	971800	51	24 3
0 40	10	961011	962672	964294	965876	967420	968926	970394	971823	50	20 3
0 44	11	961039	962699	964320	965902	967446	968951	970418	971847	49	16 3
0 48	12	4.961067	4.962727	4.964347	4.965928	4.967471	4.968976	4.970442	4.971870	48	12 3
0 52	13	961095	962754	964374	965955	967497	969000	970466	971894	47	8 3
0 56	14	961123	962781	964400	965981	967522	969025	970490	971917	46	4 3
1 0	15	961151	962808	964427	966007	967547	969050	970514	971941	45	0 3
1 4	16	4.961179	4.962836	4.964454	4.966033	4.967573	4.969075	4.970538	4.971964	44	56 2
1 8	17	961207	962863	964480	966059	967598	969099	970562	971988	43	52 2
1 12	18	961235	962890	964507	966085	967623	969124	970586	972011	42	48 2
1 16	19	961262	962918	964534	966110	967649	969149	970610	972034	41	44 2
1 20	20	4.961290	4.962945	4.964560	4.966136	4.967674	4.969173	4.970635	4.972058	40	40 2
1 24	21	961318	962972	964587	966162	967699	969198	970659	972081	39	36 2
1 28	22	961346	962999	964613	966188	967725	969223	970683	972105	38	32 2
1 32	23	961374	963027	964640	966214	967750	969247	970707	972128	37	28 2
1 36	24	4.961402	4.963054	4.964666	4.966240	4.967775	4.969272	4.970731	4.972151	36	24 2
1 40	25	961430	963081	964693	966266	967800	969297	970755	972175	35	20 2
1 44	26	961458	963108	964719	966292	967826	969321	970779	972198	34	16 2
1 48	27	961485	963135	964746	966318	967851	969346	970803	972221	33	12 2
1 52	28	4.961513	4.963162	4.964773	4.966344	4.967876	4.969370	4.970826	4.972245	32	8 2
1 56	29	961541	963190	964799	966370	967901	969395	970850	972268	31	4 2
2 0	30	961569	963217	964826	966395	967927	969420	970874	972291	30	0 2
2 4	31	961597	963244	964852	966421	967952	969444	970898	972315	29	56 1
2 8	32	4.961624	4.963271	4.964878	4.966447	4.967977	4.969469	4.970922	4.972338	28	52 1
2 12	33	961652	963298	964905	966473	968002	969493	970946	972361	27	48 1
2 16	34	961680	963325	964931	966499	968027	969518	970970	972384	26	44 1
2 20	35	961708	963352	964958	966524	968052	969542	970994	972408	25	40 1
2 24	36	4.961735	4.963379	4.964984	4.966550	4.968078	4.969567	4.971018	4.972431	24	36 1
2 28	37	961763	963406	965011	966576	968103	969591	971042	972454	23	32 1
2 32	38	961791	963434	965037	966602	968128	969616	971065	972477	22	28 1
2 36	39	961819	963461	965063	966628	968153	969640	971089	972501	21	24 1
2 40	40	4.961846	4.963488	4.965090	4.966653	4.968178	4.969665	4.971113	4.972524	20	20 1
2 44	41	961874	963515	965116	966679	968203	969689	971137	972547	19	16 1
2 48	42	961902	963542	965143	966705	968228	969714	971161	972570	18	12 1
2 52	43	961929	963569	965169	966730	968253	969738	971185	972593	17	8 1
2 56	44	4.961957	4.963596	4.965195	4.966756	4.968278	4.969762	4.971208	4.972617	16	4 1
3 0	45	961985	963623	965222	966782	968303	969787	971232	972640	15	0 1
3 4	46	962012	963650	965248	966807	968328	969811	971256	972663	14	56 0
3 8	47	962040	963677	965274	966833	968353	969836	971280	972686	13	52 0
3 12	48	4.962067	4.963704	4.965301	4.966859	4.968379	4.969860	4.971303	4.972709	12	48 0
3 16	49	962095	963730	965327	966884	968404	969884	971327	972732	11	44 0
3 20	50	962123	963757	965353	966910	968429	969909	971351	972755	10	40 0
3 24	51	962150	963784	965379	966936	968453	969933	971375	972778	9	36 0
3 28	52	4.962178	4.963811	4.965406	4.966961	4.968478	4.969957	4.971398	4.972802	8	32 0
3 32	53	962205	963838	965432	966987	968503	969982	971422	972825	7	28 0
3 36	54	962233	963865	965458	967012	968528	970006	971446	972848	6	24 0
3 40	55	962260	963892	965484	967038	968553	970030	971469	972871	5	20 0
3 44	56	4.962288	4.963919	4.965511	4.967064	4.968578	4.970055	4.971493	4.972894	4	16 0
3 48	57	962315	963946	965537	967089	968603	970079	971517	972917	3	12 0
3 52	58	962343	963972	965563	967115	968628	970103	971540	972940	2	8 0
3 56	59	962370	963999	965589	967140	968653	970127	971564	972963	1	4 0
4 0	60	4.962398	4.964026	4.965615	4.967166	4.968678	4.970152	4.971588	4.972986	0	0 0
m s Time	Arc.	227°	226°	225°	224°	223°	222°	221°	220°	Arc.	s m Time
		8m	4m	0m 15h	56m	52m	48m	44m	40m		

15 HOURS. 14 HOURS.

9 Hours. ½ Log. Haversines. 9 Hours.

Time m s	Arc. ′	20m 140°	24m 141°	28m 142°	32m 143°	36m 144°	40m 145°	44m 146°	48m 147°	Arc. ′	Time s m
0 0	0	4.972986	4.974347	4.975670	4.976957	4.978206	4.979419	4.980596	4.981737	60	0 4
0 4	1	973009	974369	975692	976978	978227	979439	980616	981756	59	56 3
0 8	2	973032	974391	975713	976999	978247	979459	980635	981774	58	52 3
0 12	3	973055	974414	975735	977020	978268	979479	980654	981793	57	48 3
0 16	4	4.973078	4.974436	4.975757	4.977041	4.978288	4.979499	4.980673	4.981812	56	44 3
0 20	5	973101	974458	975779	977062	978309	979519	980693	981830	55	40 3
0 24	6	973124	974481	975800	977083	978329	979539	980712	981849	54	36 3
0 28	7	973146	974503	975822	977104	978350	979559	980731	981868	53	32 3
0 32	8	4.973169	4.974525	4.975844	4.977125	4.978370	4.979578	4.980750	4.981886	52	28 3
0 36	9	973192	974547	975865	977146	978391	979598	980770	981905	51	24 3
0 40	10	973215	974570	975887	977167	978411	979618	980789	981924	50	20 3
0 44	11	973238	974592	975909	977188	978431	979638	980808	981942	49	16 3
0 48	12	4.973261	4.974614	4.975930	4.977209	4.978452	4.979658	4.980827	4.981961	48	12 3
0 52	13	973284	974636	975952	977230	978472	979678	980846	981979	47	8 3
0 56	14	973307	974659	975974	977251	978493	979697	980866	981998	46	4 3
1 0	15	973329	974681	975995	977272	978513	979717	980885	982016	45	0 3
1 4	16	4.973352	4.974703	4.976017	4.977293	4.978533	4.979737	4.980904	4.982035	44	56 2
1 8	17	973375	974725	976038	977314	978554	979757	980923	982054	43	52 2
1 12	18	973398	974747	976060	977335	978574	979776	980942	982072	42	48 2
1 16	19	973421	974770	976081	977356	978594	979796	980961	982091	41	44 2
1 20	20	4.973443	4.974792	4.976103	4.977377	4.978615	4.979816	4.980980	4.982109	40	40 2
1 24	21	973466	974814	976124	977398	978635	979835	981000	982128	39	36 2
1 28	22	973489	974836	976146	977419	978655	979855	981019	982146	38	32 2
1 32	23	973512	974858	976168	977440	978676	979875	981038	982165	37	28 2
1 36	24	4.973535	4.974880	4.976189	4.977461	4.978696	4.979895	4.981057	4.982183	36	24 2
1 40	25	973557	974902	976211	977482	978716	979914	981076	982202	35	20 2
1 44	26	973580	974925	976232	977503	978736	979934	981095	982220	34	16 2
1 48	27	973603	974947	976254	977523	978757	979954	981114	982238	33	12 2
1 52	28	4.973625	4.974969	4.976275	4.977544	4.978777	4.979973	4.981133	4.982257	32	8 2
1 56	29	973648	974991	976296	977565	978797	979993	981152	982275	31	4 2
2 0	30	973671	975013	976318	977586	978817	980012	981171	982294	30	0 2
2 4	31	973693	975035	976339	977607	978838	980032	981190	982312	29	56 1
2 8	32	4.973716	4.975057	4.976361	4.977628	4.978858	4.980052	4.981209	4.982331	28	52 1
2 12	33	973739	975079	976382	977648	978878	980071	981228	982349	27	48 1
2 16	34	973761	975101	976404	977669	978898	980091	981247	982367	26	44 1
2 20	35	973784	975123	976425	977690	978918	980110	981266	982386	25	40 1
2 24	36	4.973807	4.975145	4.976446	4.977711	4.978939	4.980130	4.981285	4.982404	24	36 1
2 28	37	973829	975167	976468	977732	978959	980149	981304	982422	23	32 1
2 32	38	973852	975189	976489	977752	978979	980169	981323	982441	22	28 1
2 36	39	973874	975211	976510	977773	978999	980189	981342	982459	21	24 1
2 40	40	4.973897	4.975233	4.976532	4.977794	4.979019	4.980208	4.981361	4.982477	20	20 1
2 44	41	973920	975255	976553	977814	979039	980228	981380	982496	19	16 1
2 48	42	973942	975277	976574	977835	979059	980247	981399	982514	18	12 1
2 52	43	973965	975299	976596	977856	979079	980267	981417	982532	17	8 1
2 56	44	4.973987	4.975321	4.976617	4.977877	4.979100	4.980286	4.981436	4.982551	16	4 1
3 0	45	974010	975343	976638	977897	979120	980305	981455	982569	15	0 1
3 4	46	974032	975365	976660	977918	979140	980325	981474	982587	14	56 0
3 8	47	974055	975386	976681	977939	979160	980344	981493	982605	13	52 0
3 12	48	4.974077	4.975408	4.976702	4.977959	4.979180	4.980364	4.981512	4.982624	12	48 0
3 16	49	974100	975430	976723	977980	979200	980383	981530	982642	11	44 0
3 20	50	974122	975452	976745	978001	979220	980403	981549	982660	10	40 0
3 24	51	974145	975474	976766	978021	979240	980422	981568	982678	9	36 0
3 28	52	4.974167	4.975496	4.976787	4.978042	4.979260	4.980441	4.981587	4.982696	8	32 0
3 32	53	974190	975518	976808	978062	979280	980461	981606	982715	7	28 0
3 36	54	974212	975539	976830	978083	979300	980480	981624	982733	6	24 0
3 40	55	974235	975561	976851	978104	979320	980500	981643	982751	5	20 0
3 44	56	4.974257	4.975583	4.976872	4.978124	4.979340	4.980519	4.981662	4.982769	4	16 0
3 48	57	974279	975605	976893	978145	979360	980538	981681	982787	3	12 0
3 52	58	974302	975626	976914	978165	979380	980558	981699	982805	2	8 0
3 56	59	974324	975648	976935	978186	979400	980577	981718	982823	1	4 0
4 0	60	4.974347	4.975670	4.976957	4.978206	4.979419	4.980596	4.981737	4.982842	0	0 0
m s Time	Arc.	219°	218°	217°	216°	215°	214°	213°	212°	Arc.	s m Time
		36m	32m	28m	24m	20m	16m	12m	8m		

14 Hours. 14 Hours.

9 Hours. ½ Log. Haversines. 10 Hours.

Time m s	Arc. ′	52m 148°	56m 149°	10h 0m 150°	4m 151°	8m 152°	12m 153°	16m 154°	20m 155°	Arc. ′	Time s m
0 0	0	4.982842	4.983910	4.984944	4.985942	4.986904	4.987831	4.988724	4.989581	60	0 4
0 4	1	982860	983928	984961	985958	986920	987847	988738	989595	59	56 3
0 8	2	982878	983945	984978	985974	986936	987862	988753	989609	58	52 3
0 12	3	982896	983963	984994	985991	986951	987877	988768	989623	57	48 3
0 16	4	4.982914	4.983980	4.985011	4.986007	4.986967	4.987892	4.988782	4.989637	56	44 3
0 20	5	982932	983998	985028	986023	986983	987907	988797	989651	55	40 3
0 24	6	982950	984015	985045	986039	986998	987922	988811	989665	54	36 3
0 28	7	982968	984033	985062	986056	987014	987937	988826	989679	53	32 3
0 32	8	4.982986	4.984050	4.985079	4.986072	4.987030	4.987952	4.988840	4.989693	52	28 3
0 36	9	983004	984068	985096	986088	987045	987968	988855	989707	51	24 3
0 40	10	983022	984085	985112	986104	987061	987983	988869	989721	50	20 3
0 44	11	983040	984103	985129	986121	987077	987998	988884	989735	49	16 3
0 48	12	4.983058	4.984120	4.985146	4.986137	4.987092	4.988013	4.988898	4.989749	48	12 3
0 52	13	983076	984137	985163	986153	987108	988028	988913	989763	47	8 3
0 56	14	983094	984155	985180	986169	987124	988043	988927	989777	46	4 3
1 0	15	983112	984172	985196	986185	987139	988058	988942	989790	45	0 3
1 4	16	4.983130	4.984189	4.985213	4.986202	4.987155	4.988073	4.988956	4.989804	44	56 2
1 8	17	983148	984207	985230	986218	987170	988088	988970	989818	43	52 2
1 12	18	983166	984224	985247	986234	987186	988103	988985	989832	42	48 2
1 16	19	983184	984242	985264	986250	987202	988118	988999	989846	41	44 2
1 20	20	4.983202	4.984259	4.985280	4.986266	4.987217	4.988133	4.989014	4.989860	40	40 2
1 24	21	983220	984276	985297	986282	987233	988148	989028	989873	39	36 2
1 28	22	983238	984293	985314	986299	987248	988163	989042	989887	38	32 2
1 32	23	983256	984311	985330	986315	987264	988178	989057	989901	37	28 2
1 36	24	4.983273	4.984328	4.985347	4.986331	4.987279	4.988193	4.989071	4.989915	36	24 2
1 40	25	983291	984345	985364	986347	987295	988208	989085	989929	35	20 2
1 44	26	983309	984363	985380	986363	987310	988222	989100	989942	34	16 2
1 48	27	983327	984380	985397	986379	987326	988237	989114	989956	33	12 2
1 52	28	4.983345	4.984397	4.985414	4.986395	4.987341	4.988252	4.989128	4.989970	32	8 2
1 56	29	983363	984414	985430	986411	987357	988267	989143	989984	31	4 2
2 0	30	983380	984432	985447	986427	987372	988282	989157	989997	30	0 2
2 4	31	983398	984449	985464	986443	987388	988297	989171	990011	29	56 1
2 8	32	4.983416	4.984466	4.985480	4.986459	4.987403	4.988312	4.989186	4.990025	28	52 1
2 12	33	983434	984483	985497	986475	987418	988327	989200	990038	27	48 1
2 16	34	983452	984500	985513	986491	987434	988341	989214	990052	26	44 1
2 20	35	983469	984518	985530	986507	987449	988356	989228	990066	25	40 1
2 24	36	4.983487	4.984535	4.985547	4.986523	4.987465	4.988371	4.989243	4.990079	24	36 1
2 28	37	983505	984552	985563	986539	987480	988386	989257	990093	23	32 1
2 32	38	983523	984569	985580	986555	987495	988401	989271	990107	22	28 1
2 36	39	983540	984586	985596	986571	987511	988416	989285	990120	21	24 1
2 40	40	4.983558	4.984603	4.985613	4.986587	4.987526	4.988430	4.989300	4.990134	20	20 1
2 44	41	983576	984620	985629	986603	987542	988445	989314	990148	19	16 1
2 48	42	983594	984637	985646	986619	987557	988460	989328	990161	18	12 1
2 52	43	983611	984655	985662	986635	987572	988475	989342	990175	17	8 1
2 56	44	4.983629	4.984672	4.985679	4.986651	4.987588	4.988489	4.989356	4.990188	16	4 1
3 0	45	983647	984689	985695	986667	987603	988504	989370	990202	15	0 1
3 4	46	983664	984706	985712	986683	987618	988519	989384	990215	14	56 0
3 8	47	983682	984723	985728	986699	987634	988533	989399	990229	13	52 0
3 12	48	4.983700	4.984740	4.985745	4.986714	4.987649	4.988548	4.989413	4.990243	12	48 0
3 16	49	983717	984757	985761	986730	987664	988563	989427	990256	11	44 0
3 20	50	983735	984774	985778	986746	987679	988578	989441	990270	10	40 0
3 24	51	983752	984791	985794	986762	987695	988592	989455	990283	9	36 0
3 28	52	4.983770	4.984808	4.985811	4.986778	4.987710	4.988607	4.989469	4.990297	8	32 0
3 32	53	983788	984825	985827	986794	987725	988622	989483	990310	7	28 0
3 36	54	983805	984842	985843	986809	987740	988636	989497	990324	6	24 0
3 40	55	983823	984859	985860	986825	987756	988651	989511	990337	5	20 0
3 44	56	4.983840	4.984876	4.985876	4.986841	4.987771	4.988665	4.989525	4.990351	4	16 0
3 48	57	983858	984893	985892	986857	987786	988680	989539	990364	3	12 0
3 52	58	983875	984910	985909	986873	987801	988695	989553	990377	2	8 0
3 56	59	983893	984927	985925	986888	987816	988709	989567	990391	1	4 0
4 0	60	4.983910	4.984944	4.985942	4.986904	4.987831	4.988724	4.989581	4.990404	0	0 0
m s Time	Arc.	211°	210°	209°	208°	207°	206°	205°	204°	Arc.	s m Time
		4m	0m 14h	56m	52m	48m	44m	40m	36m		

14 Hours. 13 Hours.

10 Hours. ½ Log. Haversines. 10 Hours.

Time m s	Arc. ′	24m 156°	28m 157°	32m 158°	36m 159°	40m 160°	44m 161°	48m 162°	52m 163°	Arc. ′	Time s m
0 0	0	4·990404	4·991193	4·991947	4·992666	4·993351	4·994003	4·994620	4·995203	60	0 4
0 4	1	990418	991206	991959	992678	993363	994013	994630	995213	59	56 3
0 8	2	990431	991218	991971	992689	993374	994024	994640	995222	58	52 3
0 12	3	990445	991231	991983	992701	993385	994034	944650	995231	57	48 3
0 16	4	4·990458	4·991244	4·991996	4·992713	4·993396	4·994045	4·994660	4·995241	56	44 3
0 20	5	990471	991257	992008	992724	993407	994055	994670	995250	55	40 3
0 24	6	990485	991270	992020	992736	993418	994066	994680	995260	54	36 3
0 28	7	990498	991282	992032	992748	993429	994076	994690	995269	53	32 3
0 32	8	4·990511	4·991295	4·992044	4·992759	4·993440	4·994087	4·994700	4·995278	52	28 3
0 36	9	990525	991308	992057	992771	993451	994097	994710	995288	51	24 3
0 40	10	990538	991321	992069	992783	993462	994108	994719	995297	50	20 3
0 44	11	990551	991333	992081	992794	993473	994118	994729	995306	49	16 3
0 48	12	4·990565	4·991346	4·992093	4·992806	4·993484	4·994129	4·994739	4·995316	48	12 3
0 52	13	990578	991359	992105	992817	993495	994139	994749	995325	47	8 3
0 56	14	990591	991372	992117	992829	993506	994150	994759	995334	46	4 3
1 0	15	990605	991384	992130	992841	993517	994160	994769	995344	45	0 3
1 4	16	4·990618	4·991397	4·992142	4·992852	4·993528	4·994171	4·994779	4·995353	44	56 2
1 8	17	990631	991410	992154	992864	993539	994181	994789	995362	43	52 2
1 12	18	990644	991422	992166	992875	993550	994191	994798	995372	42	48 2
1 16	19	990658	991435	992178	992887	993561	994202	994808	995381	41	44 2
1 20	20	4·990671	4·991448	4·992190	4·992898	4·993572	4·994212	4·994818	4·995390	40	40 2
1 24	21	990684	991460	992202	992910	993583	994223	994828	995399	39	36 2
1 28	22	990697	991473	992214	992921	993594	994233	994838	995409	38	32 2
1 32	23	990711	991486	992226	992933	993605	994243	994847	995418	37	28 2
1 36	24	4·990724	4·991498	4·992238	4·992944	4·993616	4·994254	4·994857	4·995427	36	24 2
1 40	25	990737	991511	992251	992956	993627	994264	994867	995436	35	20 2
1 44	26	990750	991524	992263	992967	993638	994274	994877	995445	34	16 2
1 48	27	990763	991536	992275	992979	993649	994285	994887	995455	33	12 2
1 52	28	4·990777	4·991549	4·992287	4·992990	4·993660	4·994295	4·994896	4·995464	32	8 2
1 56	29	990790	991561	992299	993002	993670	994305	994906	995473	31	4 2
2 0	30	990803	991574	992311	993013	993681	994316	994916	995482	30	0 2
2 4	31	990816	991586	992323	993024	993692	994326	994925	995491	29	56 1
2 8	32	4·990829	4·991599	4·992335	4·993036	4·993703	4·994336	4·994935	4·995500	28	52 1
2 12	33	990842	991612	992347	993047	993714	994346	994945	995510	27	48 1
2 16	34	990855	991624	992358	993059	993725	994357	994955	995519	26	44 1
2 20	35	990868	991637	992370	993070	993735	994367	994964	995528	25	40 1
2 24	36	4·990881	4·991649	4·992382	4·993081	4·993746	4·994377	4·994974	4·995537	24	36 1
2 28	37	990895	991662	992394	993093	993757	994387	994984	995546	23	32 1
2 32	38	990908	991674	992406	993104	993768	994397	994993	995555	22	28 1
2 36	39	990921	991687	992418	993115	993779	994408	995003	995564	21	24 1
2 40	40	4·990934	4·991699	4·992430	4·993127	4·993789	4·994418	4·995013	4·995573	20	20 1
2 44	41	990947	991712	992442	993138	993800	994428	995022	995582	19	16 1
2 48	42	990960	991724	992454	993149	993811	994438	995032	995591	18	12 1
2 52	43	990973	991736	992466	993161	993822	994448	995041	995600	17	8 1
2 56	44	4·990986	4·991749	4·992478	4·993172	4·993832	4·994459	4·995051	4·995609	16	4 1
3 0	45	990999	991761	992489	993183	993843	994469	995061	995619	15	0 1
3 4	46	991012	991774	992501	993195	993854	994479	995070	995628	14	56 0
3 8	47	991025	991786	992513	993206	993864	994489	995080	995637	13	52 0
3 12	48	4·991038	4·991799	4·992525	4·993217	4·993875	4·994499	4·995089	4·995646	12	48 0
3 16	49	991051	991811	992537	993228	993886	994509	995099	995655	11	44 0
3 20	50	991064	991823	992549	993240	993896	994519	995108	995663	10	40 0
3 24	51	991077	991836	992560	993251	993907	994529	995118	995672	9	36 0
3 28	52	4·991090	4·991848	4·992572	4·993262	4·993918	4·994540	4·995127	4·995681	8	32 0
3 32	53	991102	991860	992584	993273	993928	994550	995137	995690	7	28 0
3 36	54	991115	991873	992596	993284	993939	994560	995146	995699	6	24 0
3 40	55	991128	991885	992607	993296	993950	994570	995156	995708	5	20 0
3 44	56	4·991141	4·991897	4·992619	4·993307	4·993960	4·994580	4·995165	4·995717	4	16 0
3 48	57	991154	991910	992631	993318	993971	994590	995175	995726	3	12 0
3 52	58	991167	991922	992643	993329	993981	994600	995184	995735	2	8 0
3 56	59	991180	991934	992654	993340	993992	994610	995194	995744	1	4 0
4 0	60	4·991193	4·991947	4·992666	4·993351	4·994003	4·994620	4·995203	4·995753	0	0 0
m s Time	Arc.	203°	202°	201°	200°	199°	198°	197°	196°	Arc.	s m Time
		32m	28m	24m	20m	16m	12m	8m	4m		

13 Hours. 13 Hours.

10 Hours. ½ Log. Haversines. 11 Hours.

Time m s	Arc. ′	10h 56m 164°	11h 0m 165°	4m 166°	8m 167°	12m 168°	16m 169°	20m 170°	24m 171°	Arc. ′	Time s m
0 0	0	4.995753	4.996269	4.996751	4.997199	4.997614	4.997996	4.998344	4.998659	60	0 4
0 4	1	995762	996277	996758	997206	997621	998002	998350	998664	59	56 3
0 8	2	995770	996285	996766	997214	997628	998008	998355	998669	58	52 3
0 12	3	995779	996293	996774	997221	997634	998014	998361	998674	57	48 3
0 16	4	4.995788	4.996302	4.996782	4.997228	4.997641	4.998020	4.998366	4.998679	56	44 3
0 20	5	995797	996310	996789	997235	997647	998026	998372	998684	55	40 3
0 24	6	995806	996318	996797	997242	997654	998032	998377	998689	54	36 3
0 28	7	995815	996326	996805	997249	997661	998038	998383	998694	53	32 3
0 32	8	4.995823	4.996335	4.996812	4.997257	4.997667	4.998044	4.998388	4.998699	52	28 3
0 36	9	995832	996343	996820	997264	997674	998050	998394	998703	51	24 3
0 40	10	995841	996351	996828	997271	997680	998056	998399	998708	50	20 3
0 44	11	995850	996359	996835	997278	997687	998062	998404	998713	49	16 3
0 48	12	4.995859	4.996368	4.996843	4.997285	4.997693	4.998068	4.998410	4.998718	48	12 3
0 52	13	995867	996376	996851	997292	997700	998074	998415	998723	47	8 3
0 56	14	995876	996384	996858	997299	997706	998080	998421	998728	46	4 3
1 0	15	995885	996392	996866	997306	997713	998086	998426	998733	45	0 3
1 4	16	4.995894	4.996400	4.996874	4.997313	4.997719	4.998092	4.998431	4.998737	44	56 2
1 8	17	995902	996409	996881	997320	997726	998098	998437	998742	43	52 2
1 12	18	995911	996417	996889	997327	997732	998104	998442	998747	42	48 2
1 16	19	995920	996425	996896	997334	997739	998110	998448	998752	41	44 2
1 20	20	4.995928	4.996433	4.996904	4.997341	4.997745	4.998116	4.998453	4.998757	40	40 2
1 24	21	995937	996441	996911	997348	997752	998122	998458	998761	39	36 2
1 28	22	995946	996449	996919	997355	997758	998127	998464	998766	38	32 2
1 32	23	995954	996457	996927	997362	997765	998133	998469	998771	37	28 2
1 36	24	4.995963	4.996465	4.996934	4.997369	4.997771	4.998139	4.998474	4.998776	36	24 2
1 40	25	995972	996473	996942	997376	997777	998145	998479	998780	35	20 2
1 44	26	995980	996482	996949	997383	997784	998151	998485	998785	34	16 2
1 48	27	995989	996490	996957	997390	997790	998157	998490	998790	33	12 2
1 52	28	4.995998	4.996498	4.996964	4.997397	4.997797	4.998163	4.998495	4.998795	32	8 2
1 56	29	996006	996506	996972	997404	997803	998168	998501	998799	31	4 2
2 0	30	996015	996514	996979	997411	997809	998174	998506	998804	30	0 2
2 4	31	996023	996522	996987	997418	997816	998180	998511	998809	29	56 1
2 8	32	4.996032	4.996530	4.996994	4.997425	4.997822	4.998186	4.998516	4.998813	28	52 1
2 12	33	996041	996538	997002	997432	997828	998192	998522	998818	27	48 1
2 16	34	996049	996546	997009	997439	997835	998197	998527	998823	26	44 1
2 20	35	996058	996554	997016	997445	997841	998203	998532	998827	25	40 1
2 24	36	4.996066	4.996562	4.997024	4.997452	4.997847	4.998209	4.998537	4.998832	24	36 1
2 28	37	996075	996570	997031	997459	997854	998215	998542	998837	23	32 1
2 32	38	996083	996578	997039	997466	997860	998220	998547	998841	22	28 1
2 36	39	996092	996586	997046	997473	997866	998226	998553	998846	21	24 1
2 40	40	4.996100	4.996594	4.947053	4.997480	4.997872	4.998232	4.998558	4.998851	20	20 1
2 44	41	996109	996602	997061	997486	997879	998238	998563	998855	19	16 1
2 48	42	996117	996610	997068	997493	997885	998243	998568	998860	18	12 1
2 52	43	996126	996617	997076	997500	997891	998249	998573	998864	17	8 1
2 56	44	4.996134	4.996625	4.997083	4.997507	4.997897	4.598255	4.998578	4.998869	16	4 1
3 0	45	996143	996633	997090	997514	997904	998260	998583	998873	15	0 1
3 4	46	996151	996641	997098	997520	997910	998266	998589	998878	14	56 0
3 8	47	996160	996649	997105	997527	997916	998272	998594	998883	13	52 0
3 12	48	4.996168	4.996657	4.997112	4.997534	4.997922	4.998277	4.998599	4.998887	12	48 0
3 16	49	996176	996665	997120	997541	997928	998283	998604	998892	11	44 0
3 20	50	996185	996673	997127	997547	997935	998288	998609	998896	10	40 0
3 24	51	996193	996680	997134	997554	997941	998294	998614	998901	9	36 0
3 28	52	4.996202	4.996688	4.997141	4.997561	4.997947	4.998300	4.998619	4.998905	8	32 0
3 32	53	996210	996696	997149	997568	997953	998305	998624	998910	7	28 0
3 36	54	996218	996704	997156	997574	997959	998311	998629	998914	6	24 0
3 40	55	996227	996712	997163	997581	997965	998316	998634	998919	5	20 0
3 44	56	4.996235	4.996720	4.997170	4.997588	4.997972	4.998322	4.998639	4.998923	4	16 0
3 48	57	996244	996727	997178	997594	997978	998328	998644	998927	3	12 0
3 52	58	996252	996735	997185	997601	997984	998333	998649	998932	2	8 0
3 56	59	996260	996743	997192	997608	997990	998339	998654	998936	1	4 0
4 0	60	4.996269	4.996751	4.997199	4.997614	4.997996	4.998344	4.998659	4.998941	0	0 0
Time m s	Arc.	195°	194°	193°	192°	191°	190°	189°	188°	Arc.	s m Time
		0m 13h	56m 12h	52m	48m	44m	40m	36m	32m		

13 Hours. 12 Hours.

11 Hours. ½ Log. Haversines. 11 Hours.

Time m s	Arc. ′	28m 172°	32m 173°	36m 174°	40m 175°	44m 176°	48m 177°	52m 178°	56m 179°	Arc. ′	Time s m
0 0	0	4·998941	4·999189	4·999404	4·999586	4·999735	4·999851	4·999934	4·999983	60	0 4
0 4	1	998945	999193	999408	999589	999738	999853	999935	999984	59	56 3
0 8	2	998950	999197	999411	999592	999740	999854	999936	999984	58	52 3
0 12	3	998954	999201	999414	999595	999742	999856	999937	999985	57	48 3
0 16	4	4·998958	4·999205	4·999418	4·999597	4·999744	4·999858	4·999938	4·999986	56	44 3
0 20	5	998963	999208	999421	999600	999746	999859	999939	999986	55	40 3
0 24	6	998967	999212	999424	999603	999748	999861	999940	999987	54	36 3
0 28	7	998971	999216	999427	999605	999751	999862	999941	999987	53	32 3
0 32	8	4·998976	4·999220	4·999431	4·999608	4·999753	4·999864	4·999942	4·999988	52	28 3
0 36	9	998980	999224	999434	999611	999755	999866	999943	999988	51	24 3
0 40	10	998984	999227	999437	999614	999757	999867	999944	999988	50	20 3
0 44	11	998989	999231	999440	999616	999759	999869	999945	999989	49	16 3
0 48	12	4·998993	4·999235	4·999443	4·999619	4·999761	4·999870	4·999946	4·999989	48	12 3
0 52	13	998997	999239	999447	999621	999763	999872	999947	999990	47	8 3
0 56	14	999002	999242	999450	999624	999765	999873	999948	999990	46	4 3
1 0	15	999006	999246	999453	999627	999767	999875	999949	999991	45	0 3
1 4	16	4·999010	4·999250	4·999456	4·999629	4·999769	4·999876	4·999950	4·999991	44	56 2
1 8	17	999014	999253	999459	999632	999771	999878	999951	999991	43	52 2
1 12	18	999019	999257	999462	999635	999774	999879	999952	999992	42	48 2
1 16	19	999023	999261	999466	999637	999776	999881	999953	999992	41	44 2
1 20	20	4·999027	4·999265	4·999469	4·999640	4·999778	4·999882	4·999954	4·999993	40	40 2
1 24	21	999031	999268	999472	999642	999780	999884	999955	999993	39	36 2
1 28	22	999036	999272	999475	999645	999782	999885	999956	999993	38	32 2
1 32	23	999040	999276	999478	999647	999784	999887	999957	999994	37	28 2
1 36	24	4·999044	4·999279	4·999481	4·999650	4·999786	4·999888	4·999958	4·999994	36	24 2
1 40	25	999048	999283	999484	999652	999788	999890	999958	999994	35	20 2
1 44	26	999052	999286	999487	999655	999790	999891	999959	999995	34	16 2
1 48	27	999057	999290	999490	999658	999792	999892	999960	999995	33	12 2
1 52	28	4·999061	4·999294	4·999493	4·999660	4·999793	4·999894	4·999961	4·999995	32	8 2
1 56	29	999065	999297	999496	999663	999795	999895	999962	999996	31	4 2
2 0	30	999069	999301	999500	999665	999797	999897	999963	999996	30	0 2
2 4	31	999073	999304	999503	999667	999799	999898	999964	999996	29	56 1
2 8	32	4·999077	4·999308	4·999506	4·999670	4·999801	4·999899	4·999964	4·999996	28	52 1
2 12	33	999081	999312	999509	999672	999803	999901	999965	999996	27	48 1
2 16	34	999086	999315	999512	999675	999805	999902	999966	999996	26	44 1
2 20	35	999090	999319	999515	999677	999807	999903	999967	999996	25	40 1
2 24	36	4·999094	4·999322	4·999518	4·999680	4·999809	4·999905	4·999968	4·999997	24	36 1
2 28	37	999098	999326	999521	999682	999811	999906	999968	999997	23	32 1
2 32	38	999102	999329	999524	999685	999812	999907	999969	999997	22	28 1
2 36	39	999106	999333	999526	999687	999814	999909	999970	999998	21	24 1
2 40	40	4·999110	4·999336	4·999530	4·999689	4·999816	4·999910	4·999971	4·999998	20	20 1
2 44	41	999114	999340	999532	999692	999818	999911	999971	999998	19	16 1
2 48	42	999118	999343	999535	999694	999820	999912	999972	999998	18	12 1
2 52	43	999122	999347	999538	999696	999822	999914	999973	999999	17	8 1
2 56	44	4·999126	4·999350	4·999541	4·999699	4·999823	4·999915	4·999973	4·999999	16	4 1
3 0	45	999130	999354	999544	999701	999825	999916	999974	999999	15	0 1
3 4	46	999134	999357	999547	999704	999827	999917	999975	999999	14	56 0
3 8	47	999138	999361	999550	999706	999829	999919	999975	999999	13	52 0
3 12	48	4·999142	4·999364	4·999553	4·999708	4·999831	4·999920	4·999976	4·999999	12	48 0
3 16	49	999146	999367	999556	999710	999832	999921	999977	5·000000	11	44 0
3 20	50	999150	999371	999558	999713	999834	999922	999977	5·000000	10	40 0
3 24	51	999154	999374	999561	999715	999836	999924	999978	5·000000	9	36 0
3 28	52	4·999158	4·999378	4·999564	4·999717	4·999838	4·999925	4·999979	5·000000	8	32 0
3 32	53	999162	999381	999567	999720	999839	999926	999979	5·000000	7	28 0
3 36	54	999166	999384	999570	999722	999841	999927	999980	5·000000	6	24 0
3 40	55	999170	999388	999572	999724	999843	999928	999981	5·000000	5	20 0
3 44	56	4·999174	4·999391	4·999575	4·999726	4·999844	4·999929	4·999981	5·000000	4	16 0
3 48	57	999178	999394	999578	999729	999846	999930	999982	5·000000	3	12 0
3 52	58	999181	999398	999581	999731	999848	999932	999982	5·000000	2	8 0
3 56	59	999185	999401	999584	999733	999849	999933	999983	5·000000	1	4 0
4 0	60	4·999189	4·999404	4·999586	4·999735	4·999851	4·999934	4·999983	5·000000	0	0 0
m s Time	Arc.	187°	186°	185°	184°	183°	182°	181°	180°	Arc.	s m Time
		28m	24m	20m	16m	12m	8m	4m	0m 12h		

12 Hours. 12 Hours.

0 Hours.		Log. Haversines.								0 Hours.		
		0m	1m	2m	3m	4m	5m	6m	7m	8m	9m	
		0 deg.				I deg.				2 deg.		
sec.	″	0′	15′	30′	45′	0′	15′	30′	45′	0′	15′	sec.
0	0	0.000000	4.677574	5.279632	5.631811	5.881684	6.075498	6.233852	6.367737	6.483711	6.586004	60
1	15	1.121274	691931	286840	636623	885295	078388	236262	369802	485518	587611	59
2	30	1.723332	706055	293989	641409	888892	081269	238664	371863	487322	589215	58
3	45	2.075516	719952	301079	646168	892473	084140	241060	373919	489122	590815	57
		1′	16′	31′	46′	1′	16′	31′	46′	1′	16′	
4	0	2.325392	4.733631	5.308113	5.650901	5.896041	6.087002	6.243450	6.375970	6.490918	6.592413	56
5	15	519212	747098	315089	655609	899593	089854	245832	378016	492711	594008	55
6	30	677575	760359	322010	660292	903131	092697	248209	380057	494500	595600	54
7	45	811470	773421	328876	664949	906654	095531	250579	382093	496285	597190	53
		2′	17′	32′	47′	2′	17′	32′	47′	2′	17′	
8	0	2.927452	4.786289	5.335689	5.669581	5.910164	6.098356	6.252942	6.384125	6.498066	6.598776	52
9	15	3.029759	798969	342448	674189	913659	101171	255299	386152	499844	600359	51
10	30	121272	811467	349156	678773	917140	103977	257650	388174	501618	601940	50
11	45	204057	823788	355811	683332	920608	106774	259994	390191	503389	603517	49
		3′	18′	33′	48′	3′	18′	33′	48′	3′	18′	
12	0	3.279635	4.835936	5.362417	5.687868	5.924061	6.109563	6.262332	6.392204	6.505156	6.605092	48
13	15	349159	847917	368972	692380	927501	112342	264663	394212	506920	606664	47
14	30	413528	859735	375478	696869	930927	115113	266989	396216	508679	608233	46
15	45	473454	871393	381936	701334	934340	117874	269308	398215	510436	609799	45
		4′	19′	34′	49′	4′	19′	34′	49′	4′	19′	
16	0	3.529512	4.882898	5.388347	5.705777	5.937740	6.120627	6.271621	6.400209	6.512189	6.611363	44
17	15	582170	894252	394710	710197	941126	123371	273928	402198	513938	612923	43
18	30	631817	905460	401027	714595	944499	126107	276229	404184	515683	614481	42
19	45	678780	916525	407298	718971	947859	128834	278523	406164	517426	616036	41
		5′	20′	35′	50′	5′	20′	35′	50′	5′	20′	
20	0	3.723332	4.927451	5.413525	5.723325	5.951206	6.131553	6.280812	6.408141	6.519164	6.617588	40
21	15	765711	938241	419707	727657	954540	134263	283094	410112	520900	619138	39
22	30	806118	948899	425845	731967	957862	136964	285371	412079	522631	620684	38
23	45	844728	959427	431940	736256	961170	139657	287642	414042	524360	622228	37
		6′	21′	36′	51′	6′	21′	36′	51′	6′	21′	
24	0	3.881695	4.969829	5.437993	5.740525	5.964467	6.142342	6.289906	6.416000	6.526085	6.623770	36
25	15	917152	980108	444004	744772	967750	145019	292165	417954	527806	625308	35
26	30	951219	990268	449974	748999	971022	147687	294418	419904	529524	626844	34
27	45	984000	5.000309	455903	753205	974281	150347	296665	421849	531239	628377	33
		7′	22′	37′	52′	7′	22′	37′	52′	7′	22′	
28	0	4.015588	5.010236	5.461791	5.757391	5.977528	6.152999	6.298907	6.423790	6.532950	6.629907	32
29	15	046068	020050	467640	761556	980763	155643	301142	425726	534658	631435	31
30	30	075515	029756	473450	765702	983986	158279	303372	427659	536363	632960	30
31	45	103996	039353	479222	769829	987197	160907	305596	429586	538064	634482	29
		8′	23′	38′	53′	8′	23′	38′	53′	8′	23′	
32	0	4.131572	5.048846	5.484955	5.773935	5.990396	6.163527	6.307815	6.431510	6.539762	6.636002	28
33	15	158300	058236	490650	778023	993583	166139	310028	433429	541457	637519	27
34	30	184230	067526	496309	782091	996759	168744	312235	435345	543148	639033	26
35	45	209408	076717	501931	786140	999923	171340	314437	437255	544836	640545	25
		9′	24′	39′	54′	9′	24′	39′	54′	9′	24′	
36	0	4.233877	5.085813	5.507517	5.790171	6.003076	6.173929	6.316633	6.439162	6.546521	6.642054	24
37	15	257675	094814	513067	794183	006217	176510	318823	441065	548202	643560	23
38	30	280839	103723	518582	798176	009347	179084	321008	442963	549880	645064	22
39	45	303401	112540	524062	802151	012466	181650	323187	444857	551555	646565	21
		10′	25′	40′	55′	10′	25′	40′	55′	10′	25′	
40	0	4.325392	5.121270	5.529507	5.806108	6.015573	6.184208	6.325362	6.446747	6.553227	6.648064	20
41	15	346840	129913	534919	810047	018670	186759	327530	448633	554896	649560	19
42	30	367771	138471	540297	813969	021755	189302	329693	450515	556561	651053	18
43	45	388209	146944	545642	817872	024830	191838	331851	452393	558223	652544	17
		11′	26′	41′	56′	11′	26′	41′	56′	11′	26′	
44	0	4.408177	5.155337	5.550955	5.821759	6.027894	6.194366	6.334004	6.454267	6.559882	6.654033	16
45	15	427697	163648	556235	825628	030946	196888	336151	456137	561538	655518	15
46	30	446788	171882	561483	829479	033989	199402	338293	458003	563191	657002	14
47	45	465467	180037	566700	833314	037020	201908	340429	459864	564840	658482	13
		12′	27′	42′	57′	12′	27′	42′	57′	12′	27′	
48	0	4.483754	5.188118	5.571885	5.837132	6.040041	6.204408	6.342561	6.461722	6.566487	6.659961	12
49	15	501664	196123	577040	840933	043052	206900	344687	463576	568130	661436	11
50	30	519212	204055	582165	844718	046052	209385	346808	465426	569770	662910	10
51	45	536412	211916	587259	848486	049042	211863	348923	467272	571407	664380	9
		13′	28′	43′	58′	13′	28′	43′	58′	13′	28′	
52	0	4.553278	5.219706	5.592323	5.852238	6.052022	6.214334	6.351034	6.469114	6.573041	6.665849	8
53	15	569823	227427	597359	855974	054991	216798	353140	470952	574672	667314	7
54	30	586059	235079	602365	859693	057950	219255	355240	472786	576300	668778	6
55	45	601997	242665	607342	863397	060900	221705	357335	474616	577925	670238	5
		14′	29′	44′	59′	14′	29′	44′	59′	14′	29′	
56	0	4.617648	5.250186	5.612292	5.867086	6.063839	6.224148	6.359426	6.476443	6.579547	6.671697	4
57	15	633021	257641	617213	870758	066768	226584	361511	478265	581166	673153	3
58	30	648128	265034	622106	874415	069688	229014	363591	480084	582781	674606	2
59	45	662975	272363	626972	878057	072597	231436	365667	481899	584394	676057	1
60	60	4.677574	5.279632	5.631811	5.881684	6.075498	6.233852	6.367737	6.483711	6.586004	6.677506	0
sec.		59m	58m	57m	56m	55m	54m	53m	52m	51m	50m	sec.

0 Hours.	Log. Haversines.	0 Hours.

	10m	11m	12m	13m	14m	15m	16m	17m	18m	19m	
	2 deg.		3 deg.				4 deg.				
sec.	″	30′ 45′	0′ 15′	30′ 45′			0′ 15′	30′ 45′			sec.
0	0	6.677506 6.760277	6.835838 6.905345	6.969696 7.029602			7.085639 7.138273	7.187897 7.234833			60
1	15	678952 76159?	837043 906458	970729 030566			086542 139124	188700 235594			59
2	30	680396 762904	838247 907569	971761 031530			087445 139974	189503 236355			58
3	45	681837 764215	839449 908678	972791 032492			088347 140823	190305 237115			57
		31′ 46′	1′ 16′	31′ 46′			1′ 16′	31′ 46′			
4	0	6.683276 6.765524	6.840649 6.909787	6.973821 7.033453			7.089248 7.141671	7.191106 7.237874			56
5	15	684713 766831	841848 910894	974849 034413			090149 142519	191906 238632			55
6	30	686147 768136	843045 911999	975876 035372			091048 143365	192706 239390			54
7	45	687579 769439	844240 913103	976902 036329			091946 144211	193505 240147			53
		32′ 47′	2′ 17′	32′ 47′			2′ 17′	32′ 47′			
8	0	6.689009 6.770740	6.845434 6.914206	6.977926 7.037286			7.092844 7.145056	7.194303 7.240904			52
9	15	690436 772039	846626 915307	978950 038242			093740 145900	195101 241660			51
10	30	691861 773336	847816 916407	979972 039197			094636 146744	195898 242415			50
11	45	693283 774631	849005 917505	980993 040150			095530 147586	196694 243169			49
		33′ 48′	3′ 18′	33′ 48′			3′ 18′	33′ 48′			
12	0	6.694703 6.775924	6.850192 6.918603	6.982013 7.041103			7.096424 7.148428	7.197489 7.243923			48
13	15	696121 777216	851377 919698	983031 042054			097317 149269	198284 244676			47
14	30	697537 778505	852561 920793	984048 043005			098209 150109	199078 245429			46
15	45	698950 779793	853743 921886	985064 04395-			099100 150948	199871 246181			45
		34′ 49′	4′ 19′	34′ 49′			4′ 19′	34′ 49′			
16	0	6.700361 6.781078	6.854924 6.922977	6.986080 7.044903			7.099990 7.151786	7.200663 7.246932			44
17	15	701770 782362	856103 924067	987093 045850			100879 152624	201455 247683			43
18	30	703176 783644	857281 925156	988106 046796			101767 153461	202246 248433			42
19	45	704580 784924	858457 926244	989117 047742			102654 154297	203036 249182			41
		35′ 50′	5′ 20′	35′ 50′			5′ 20′	35′ 50′			
20	0	6.705982 6.786202	6.859631 6.927330	6.990128 7.048686			7.103541 7.155132	7.203826 7.249931			40
21	15	707382 787478	860804 928414	991137 049629			104426 155966	204615 250679			39
22	30	708779 788752	861975 929498	992145 050571			105311 156800	205403 251426			38
23	45	710174 790024	863144 930580	993151 051513			106194 157633	206190 252173			37
		36′ 51′	6′ 21′	36′ 51′			6′ 21′	36′ 51′			
24	0	6.711567 6.791295	6.864312 6.931661	6.994157 7.052453			7.107077 7.158465	7.206977 7.252919			36
25	15	712957 792564	865478 932740	995161 053392			107959 159296	207763 253664			35
26	30	714346 793830	866643 933818	996165 054330			108840 160126	208548 254409			34
27	45	715732 795095	867807 934895	997167 055267			109720 160956	209333 255153			33
		37′ 52′	7′ 22′	37′ 52′			7′ 22′	37′ 52′			
28	0	6.717116 6.796359	6.868968 6.935970	6.998168 7.055203			7.110599 7.161785	7.210117 7.255897			32
29	15	718498 797620	870128 937044	999167 057138			111478 162613	210900 256640			31
30	30	719877 798879	871287 938117	7.000166 058073			112355 163440	211682 257382			30
31	45	721255 800137	872444 939188	001163 059006			113232 164266	212464 258124			29
		38′ 53′	8′ 23′	38′ 53′			8′ 23′	38′ 53′			
32	0	6.722630 6.801393	6.873600 6.940258	7.002160 7.059938			7.114107 7.155092	7.213245 7.258865			28
33	15	724003 802647	874754 941327	003155 060869			114982 165917	214025 259605			27
34	30	725374 803899	875906 942394	004149 061799			115856 166741	214805 260345			26
35	45	726743 805149	877057 943460	005142 062728			116729 167564	215584 261084			25
		39′ 54′	9′ 24′	39′ 54′			9′ 24′	39′ 54′			
36	0	6.728109 6.806398	6.878206 6.944525	7.006134 7.063656			7.117601 7.168387	7.216362 7.261822			24
37	15	729473 807645	879354 945589	007124 064583			118472 169208	217140 262560			23
38	30	730836 808890	880501 946651	008114 065510			119343 170029	217917 263297			22
39	45	732196 810133	881645 947712	009102 066435			120212 170849	218693 264034			21
		40′ 55′	10′ 25′	40′ 55′			10′ 25′	40′ 55′			
40	0	6.733554 6.811375	6.882789 6.948771	7.010089 7.067359			7.121081 7.171669	7.219468 7.264770			20
41	15	734910 812614	883931 949829	011075 068282			121949 172488	220243 265505			19
42	30	736263 813852	885071 950887	012061 069204			122816 173305	221017 266240			18
43	45	737615 815088	886210 951942	013044 070125			123681 174122	221790 266974			17
		41′ 56′	11′ 26′	41′ 56′			11′ 26′	41′ 56′			
44	0	6.738965 6.816323	6.887347 6.952997	7.014027 7.071046			7.124547 7.174939	7.222563 7.267707			16
45	15	740312 817555	888483 954050	015009 071965			125411 175754	223335 268440			15
46	30	741657 818786	889617 955102	015989 072883			126275 176569	224106 269172			14
47	45	743001 820015	890750 956152	016969 073800			127137 177383	224877 269904			13
		42′ 57′	12′ 27′	42′ 57′			12′ 27′	42′ 57′			
48	0	6.744342 6.821243	6.891882 6.957202	7.017947 7.074717			7.127999 7.178196	7.225647 7.270635			12
49	15	745681 822468	893012 958250	018924 075632			128860 179009	226416 271365			11
50	30	747018 823692	894140 959297	019901 076547			129720 179821	227185 272095			10
51	45	748353 824915	895267 960342	020876 077460			130579 180632	227953 272824			9
		43′ 58′	13′ 28′	43′ 58′			13′ 28′	43′ 58′			
52	0	6.749686 6.826135	6.896393 6.961386	7.021850 7.078373			7.131437 7.181442	7.228720 7.273553			8
53	15	751017 827354	897517 962429	022823 079284			132295 182251	22948 274281			7
54	30	752346 828571	898640 963471	023794 080195			133151 183060	23025 275008			6
55	45	753673 829786	899761 964512	024765 081104			134007 183868	231017 275735			5
		44′ 59′	14′ 29′	44′ 59′			14′ 29′	44′ 59′			
56	0	6.754998 6.831000	6.900880 6.965551	7.025735 7.082013			7.134862 7.184675	7.231782 7.276461			4
57	15	756320 832212	901999 966599	026703 082921			135716 185482	232546 277186			3
58	30	757641 833422	903116 967626	027671 083828			136569 186287	233309 277911			2
59	45	758960 834631	904231 968661	028637 084733			137422 187092	234071 278635			1
60	60	6.760277 6.835838	6.905345 6.969696	7.029602 7.085638			7.138273 7.187897	7.234833 7.279359			0
sec.		49m 48m	47m 46m	45m 44m			43m 42m	41m 40m			sec.

0 Hours. Log. Haversines. 0 Hours.

sec.	20m	21m	22m	23m	24m	25m	26m	27m	28m	29m	sec.
	5 deg.				6 deg.				7 deg.		
	0′	15′	30′	45′	0′	15′	30′	45′	0′	15′	
0	0 7.279359	7.321709	7.362087	7.400666	7.437600	7.473024	7.507056	7.539800	7.571351	7.601791	60
1	15 280082	322398	362744	401294	438203	473602	507612	540335	571867	602290	59
2	30 280805	323086	363401	401923	438805	474180	508167	540870	572383	602788	58
3	45 281526	323774	364057	402550	439406	474758	508723	541405	572898	603285	57
	1′	16′	31′	46′	1′	16′	31′	46′	1′	16′	
4	0 7.282248	7.324461	7.364713	7.403178	7.440008	7.475335	7.509278	7.541939	7.573414	7.603783	56
5	15 282968	325147	365368	403805	440608	475912	509832	542474	573929	604280	55
6	30 283688	325833	366023	404431	441209	476488	510386	543007	574443	604777	54
7	45 284408	326518	366677	405057	441809	477064	510940	543541	574958	605274	53
	2′	17′	32′	47′	2′	17′	32′	47′	2′	17′	
8	0 7.285127	7.327203	7.367331	7.405682	7.442408	7.477640	7.511494	7.544074	7.575472	7.605770	52
9	15 285845	327887	367984	406307	443007	478215	512047	544606	575985	606266	51
10	30 286563	328571	368637	406932	443606	478790	512600	545139	576499	606762	50
11	45 287280	329254	369289	407556	444204	479364	513152	545671	577012	607258	49
	3′	18′	33′	48′	3′	18′	33′	48′	3′	18′	
12	0 7.287996	7.329937	7.369941	7.408180	7.444802	7.479938	7.513704	7.546203	7.577525	7.607753	48
13	15 288712	330619	370592	408803	445399	480512	514256	546734	578037	608248	47
14	30 289428	331300	371243	409426	445996	481085	514807	547265	578550	608743	46
15	45 290142	331981	371894	410048	446593	481658	515358	547796	579062	609237	45
	4′	19′	34′	49′	4′	19′	34′	49′	4′	19′	
16	0 7.290856	7.332662	7.372544	7.410670	7.447189	7.482231	7.515909	7.548327	7.579573	7.609731	44
17	15 291570	333342	373193	411291	447785	482803	516460	548857	580085	610225	43
18	30 292283	334021	373842	411913	448380	483375	517010	549386	580596	610718	42
19	45 292995	334700	374490	412533	448975	483946	517559	549916	581106	611212	41
	5′	20′	35′	50′	5′	20′	35′	50′	5′	20′	
20	0 7.293707	7.335379	7.375138	7.413153	7.449570	7.484517	7.518109	7.550445	7.581617	7.611705	40
21	15 294418	336056	375786	413773	450164	485088	518658	550974	582127	612197	39
22	30 295129	336734	376433	414392	450758	485658	519206	551502	582637	612690	38
23	45 295839	337410	377079	415011	451351	486228	519754	552031	583146	613182	37
	6′	21′	36′	51′	6′	21′	36′	51′	6′	21′	
24	0 7.296548	7.338087	7.377725	7.415629	7.451944	7.486798	7.520302	7.552559	7.583656	7.613674	36
25	15 297257	338762	378371	416247	452537	487367	520850	553086	584164	614165	35
26	30 297965	339438	379016	416865	453129	487936	521397	553613	584673	614657	34
27	45 298673	340112	379660	417481	453721	488504	521944	554140	585181	615148	33
	7′	22′	37′	52′	7′	22′	37′	52′	7′	22′	
28	0 7.299380	7.340786	7.380304	7.418098	7.454312	7.489072	7.522491	7.554667	7.585696	7.615638	32
29	15 300087	341460	380948	418714	454903	489640	523037	555193	586197	616129	31
30	30 300793	342133	381591	419330	455493	490207	523583	555719	586705	616619	30
31	45 301498	342806	382234	419945	456083	490774	524128	556245	587212	617109	29
	8′	23′	38′	53′	8′	23′	38′	53′	8′	23′	
32	0 7.302203	7.343478	7.382876	7.420560	7.456673	7.491341	7.524673	7.556770	7.587719	7.617599	28
33	15 302907	344149	383517	421174	457262	491907	525218	557295	588225	618088	27
34	30 303611	344820	384159	421788	457851	492473	525763	557820	588732	618577	26
35	45 304314	345491	384799	422402	458440	493038	526307	558344	589237	619066	25
	9′	24′	39′	54′	9′	24′	39′	54′	9′	24′	
36	0 7.305017	7.346161	7.385440	7.423015	7.459028	7.493603	7.526850	7.558868	7.589743	7.619554	24
37	15 305719	346830	386079	423628	459616	494168	527394	559392	590248	620043	23
38	30 306420	347499	386719	424240	460203	494732	527937	559915	590754	620531	22
39	45 307121	348168	387358	424852	460790	495296	528480	560438	591258	621018	21
	10′	25′	40′	55′	10′	25′	40′	55′	10′	25′	
40	0 7.307821	7.348835	7.387996	7.425463	7.461376	7.495860	7.529022	7.560961	7.591763	7.621506	20
41	15 308521	349503	388634	426074	461962	496423	529564	561483	592267	621993	19
42	30 309220	350170	389271	426684	462548	496986	530106	562006	592771	622480	18
43	45 309919	350836	389908	427294	463134	497548	530647	562527	593274	622966	17
	11′	26′	41′	56′	11′	26′	41′	56′	11′	26′	
44	0 7.310617	7.351502	7.390545	7.427904	7.463719	7.498111	7.531189	7.563049	7.593778	7.623453	16
45	15 311314	352167	391181	428513	464303	498672	531729	563570	594281	623939	15
46	30 312011	352832	391816	429122	464887	499234	532270	564091	594784	624425	14
47	45 312708	353496	392452	429730	465471	499795	532810	564611	595286	624910	13
	12′	27′	42′	57′	12′	27′	42′	57′	12′	27′	
48	0 7.313403	7.354160	7.393086	7.430338	7.466054	7.500355	7.533349	7.565132	7.595788	7.625395	12
49	15 314098	354824	393720	430946	466637	500916	533889	565652	596290	625880	11
50	30 314793	355486	394354	431553	467220	501476	534428	566171	596792	626365	10
51	45 315487	356149	394987	432160	467802	502035	534966	566691	597293	626849	9
	13′	28′	43′	58′	13′	28′	43′	58′	13′	28′	
52	0 7.316181	7.356810	7.395620	7.432766	7.468384	7.502595	7.535505	7.567210	7.597794	7.627334	8
53	15 316874	357472	396252	433372	468965	503153	536043	567728	598284	627817	7
54	30 317566	358133	396884	433977	469546	503712	536581	568247	598795	628301	6
55	45 318258	358793	397516	434582	470127	504270	537118	568765	599295	628784	5
	14′	29′	44′	59′	14′	29′	44′	59′	14′	29′	
56	0 7.318950	7.359453	7.398147	7.435186	7.470707	7.504828	7.537655	7.569283	7.599795	7.629267	4
57	15 319640	360112	398777	435790	471287	505385	538192	569800	600294	629750	3
58	30 320331	360771	399407	436394	471866	505943	538728	570317	600794	630233	2
59	45 321020	361429	400037	436997	472445	506499	539264	570834	601292	630715	1
60	60 7.321709	7.362087	7.400666	7.437600	7.473024	7.507056	7.539800	7.571351	7.601791	7.631197	0
sec.	39m	38m	37m	36m	35m	34m	33m	32m	31m	30m	sec.

23 Hours. 23 Hours.

0 Hours.	Log. Haversines.	0 Hours.

sec.	30m	31m	32m	33m	34m	35m	36m	37m	38m	39m	sec.
	7 deg.		8 deg.				9 deg.				
	″ 30′	45′	0′	15′	30′	45′	0′	15′	30′	45′	
0	0 7.631197	7.659636	7.687169	7.713852	7.739736	7.764867	7.789287	7.813035	7.836147	7.858656	60
1	15 631679	660102	687620	714290	740161	765279	789688	813425	836527	859026	59
2	30 632160	660568	688072	714728	740586	765692	790089	813815	836907	859396	58
3	45 632641	661034	688523	715165	741010	766104	790490	814205	837286	859766	57
	31′	46′	1′	16′	31′	46′	1′	16′	31′	46′	
4	0 7.633122	7.661499	7.688974	7.715602	7.741434	7.766516	7.790890	7.814595	7.837666	7.860136	56
5	15 633603	661964	689424	716039	741858	766928	791291	814985	838045	860505	55
6	30 634083	662429	689875	716476	742282	767340	791691	815374	838424	860875	54
7	45 634564	662894	690325	716912	742706	767751	792091	815763	838803	861244	53
	32′	47′	2′	17′	32′	47′	2′	17′	32′	47′	
8	0 7.635043	7.663358	7.690775	7.717348	7.743129	7.768163	7.792491	7.816152	7.839182	7.861613	52
9	15 635523	663822	691224	717784	743552	768574	792891	816541	839561	861982	51
10	30 636002	664286	691674	718220	743975	768985	793290	816930	839939	862351	50
11	45 636481	664750	692123	718656	744398	769396	793690	817318	840318	862719	49
	33′	48′	3′	18′	33′	48′	3′	18′	33′	48′	
12	0 7.636960	7.665213	7.692572	7.719091	7.744821	7.769806	7.794089	7.817707	7.840696	7.863088	48
13	15 637439	665676	693021	719526	745243	770216	794488	818095	841074	863456	47
14	30 637917	666139	693469	719961	745666	770627	794887	818483	841452	863824	46
15	45 638395	666602	693917	720396	746087	771037	795285	818871	841829	864192	45
	34′	49′	4′	19′	34′	49′	4′	19′	34′	49′	
16	0 7.638873	7.667064	7.694365	7.720831	7.746509	7.771446	7.795684	7.819259	7.842207	7.864561	44
17	15 639350	667526	694813	721265	746931	771856	796082	819646	842584	864928	43
18	30 639827	667988	695261	721699	747352	772265	796480	820034	842961	865295	42
19	45 640304	668450	695708	722133	747773	772675	796878	820421	843338	865663	41
	35′	50′	5′	20′	35′	50′	5′	20′	35′	50′	
20	0 7.640781	7.668911	7.696155	7.722567	7.748194	7.773084	7.797275	7.820808	7.843715	7.866030	40
21	15 641257	669372	696602	723000	748615	773492	797673	821195	844092	866397	39
22	30 641734	669833	697049	723433	749036	773901	798070	821581	844468	866764	38
23	45 642209	670294	697495	723866	749456	774309	798467	821968	844845	867131	37
	36′	51′	6′	21′	36′	51′	6′	21′	36′	51′	
24	0 7.642685	7.670755	7.697941	7.724299	7.749876	7.774718	7.798864	7.822354	7.845221	7.867497	36
25	15 643160	671215	698387	724731	750296	775126	799261	822740	845597	867864	35
26	30 643636	671675	698833	725164	750716	775534	799658	823126	845973	868230	34
27	45 644110	672134	699278	725596	751135	775941	800054	823512	846349	868596	33
	37′	52′	7′	22′	37′	52′	7′	22′	37′	52′	
28	0 7.644585	7.672594	7.699724	7.726028	7.751555	7.776349	7.800450	7.823897	7.846724	7.868962	32
29	15 645059	673053	700169	726459	751974	776756	800846	824283	847099	869328	31
30	30 645533	673512	700614	726891	752393	777163	801242	824668	847475	869694	30
31	45 646007	673971	701058	727322	752811	777570	801638	825053	847850	870059	29
	38′	53′	8′	23′	38′	53′	8′	23′	38′	53′	
32	0 7.646481	7.674429	7.701502	7.727753	7.753230	7.777977	7.802034	7.825438	7.848225	7.870424	28
33	15 646954	674887	701947	728184	753648	778383	802429	825823	848599	870790	27
34	30 647427	675346	702390	728615	754066	778789	802824	826207	848974	871155	26
35	45 647900	675803	702834	729045	754484	779195	803219	826592	849348	871520	25
	39′	54′	9′	24′	39′	54′	9′	24′	39′	54′	
36	0 7.648372	7.676261	7.703278	7.729475	7.754902	7.779601	7.803614	7.826976	7.849723	7.871884	24
37	15 648845	676718	703721	729905	755319	780007	804008	827360	850097	872249	23
38	30 649317	677175	704164	730335	755737	780413	804403	827744	850470	872613	22
39	45 649788	677632	704606	730765	756154	780818	804797	828128	850844	872978	21
	40′	55′	10′	25′	40′	55′	10′	25′	40′	55′	
40	0 7.650260	7.678088	7.705049	7.731194	7.756571	7.781223	7.805191	7.828511	7.851218	7.873342	20
41	15 650731	678545	705491	731623	756987	781628	805585	828895	851591	873706	19
42	30 651202	679001	705933	732052	757404	782033	805979	829278	851964	874070	18
43	45 651673	679457	706375	732481	757820	782437	806372	829661	852338	874433	17
	41′	56′	11′	26′	41′	56′	11′	26′	41′	56′	
44	0 7.652143	7.679912	7.706817	7.732909	7.758236	7.782842	7.806766	7.830044	7.852711	7.874797	16
45	15 652613	660367	707258	733337	758652	783246	807159	830426	853083	875160	15
46	30 653083	680823	707699	733765	759068	783650	807552	830809	853456	875523	14
47	45 653553	681277	708140	734193	759483	784054	807944	831191	853828	875886	13
	42′	57′	12′	27′	42′	57′	12′	27′	42′	57′	
48	0 7.654022	7.681732	7.708581	7.734621	7.759899	7.784458	7.808337	7.831574	7.854201	7.876249	12
49	15 654492	682186	709021	735048	760314	784861	808729	831956	854573	876612	11
50	30 654961	682641	709462	735475	760729	785264	809122	832338	854945	876975	10
51	45 655429	683095	709902	735902	761143	785667	809514	832719	855317	877337	9
	43′	58′	13′	28′	43′	58′	13′	28′	43′	58′	
52	0 7.655898	7.683548	7.710342	7.736329	7.761558	7.786070	7.809906	7.833101	7.855688	7.877699	8
53	15 656366	684002	710781	736756	761972	786473	810297	833482	856060	878061	7
54	30 656834	684455	711221	737182	762386	786875	810689	833863	856431	878423	6
55	45 657301	684908	711660	737608	762800	787278	811080	834244	856802	878785	5
	44′	59′	14′	29′	44′	59′	14′	29′	44′	59′	
56	0 7.657769	7.685361	7.712099	7.738034	7.763214	7.787680	7.811472	7.834625	7.857173	7.879147	4
57	15 658236	685813	712537	738460	763627	788082	811863	835006	857544	879508	3
58	30 658703	686265	712976	738886	764041	788484	812254	835386	857915	879870	2
59	45 659169	686717	713414	739311	764454	788885	812644	835767	858285	880231	1
60	60 7.659636	7.687169	7.713852	7.739736	7.764867	7.789287	7.813035	7.836147	7.858656	7.880592	0
sec.	29m	28m	27m	26m	25m	24m	23m	22m	21m	20m	sec.

0 Hours. LOG. HAVERSINES. 0 Hours.

sec.	40m	41m	42m	43m	44m	45m	46m	47m	48m	49m	sec.
	10 deg				11 deg.				12 deg.		
	0′	15′	30′	45′	0′	15′	30′	45′	0′	15′	
0	0 7.880592	7.901984	7.922858	7.943237	7.963146	7.982604	8.001632	8.020248	8.038469	8.056312	60
1	15 880953	902336	923201	943573	963474	982925	001945	020555	038770	056606	59
2	30 881314	902688	923545	943908	963801	983245	002259	020862	039070	056900	58
3	45 881674	903040	923888	944244	964129	983565	002572	021168	039370	057194	57
	1′	16′	31′	46′	1′	16′	31′	46′	1′	16′	
4	0 7.882035	7.903391	7.924231	7.944579	7.964457	7.983886	8.002886	8.021475	8.039670	8.057488	56
5	15 882395	903743	924574	944914	964784	984206	003199	021781	039970	057782	55
6	30 882755	904094	924917	945249	965111	984526	003512	022087	040270	058076	54
7	45 883115	904445	925260	945584	965439	984846	003825	022394	040570	058370	53
	2′	17′	32′	47′	2′	17′	32′	47′	2′	17′	
8	0 7.883475	7.904796	7.925603	7.945918	7.965766	7.985166	8.004137	8.022700	8.040870	8.058663	52
9	15 883835	905147	925945	946253	966093	985485	004450	023006	041169	058957	51
10	30 884194	905498	926288	946587	966420	985805	004763	023312	041469	059250	50
11	45 884554	905849	926630	946922	966746	986124	005075	023617	041768	059543	49
	3′	18′	33′	48′	3′	18′	33′	48′	3′	18′	
12	0 7.884913	7.906199	7.926972	7.947256	7.967073	7.986443	8.005388	8.023923	8.042067	8.059836	48
13	15 885272	906550	927314	947590	967399	986763	005700	024229	042367	060129	47
14	30 885631	906900	927656	947924	967726	987082	006012	024534	042666	060422	46
15	45 885990	907250	927998	948258	968052	987401	006324	024839	042965	060715	45
	4′	19′	34′	49′	4′	19′	34′	49′	4′	19′	
16	0 7.886349	7.907600	7.928339	7.948591	7.968378	7.987719	8.006636	8.025145	8.043264	8.061008	44
17	15 886707	907950	928681	948925	968704	988038	006947	025450	043562	061301	43
18	30 887066	908299	929022	949258	969030	988357	007259	025755	043861	061593	42
19	45 887424	908649	929363	949592	969355	988675	007571	026060	044160	061886	41
	5′	20′	35′	50′	5′	20′	35′	50′	5′	20′	
20	0 7.887782	7.908998	7.929705	7·949925	7.969681	7.988994	8.007882	8.026365	8.044458	8.062178	40
21	15 888140	909347	930045	950258	970006	989312	008193	026669	044756	062470	39
22	30 888497	909696	930386	950591	970332	989630	008505	026974	045055	062763	38
23	45 888855	910045	930727	950923	970657	989948	008816	027278	045353	063054	37
	6′	21′	36′	51′	6′	21′	36′	51′	6′	21′	
24	0 7.889213	7.910394	7.931067	7.951256	7.970982	7.990266	8.009127	8.027583	8.045651	8.063347	36
25	15 889570	910743	931408	951588	971307	990584	009438	027887	045949	063638	35
26	30 889927	911091	931748	951921	971632	990901	009748	028191	046247	063930	34
27	45 890284	911440	932088	952253	971956	991219	010059	028495	046544	064222	33
	7′	22′	37′	52′	7′	22′	37′	52′	7′	22′	
28	0 7.890641	7.911788	7.932428	7.952585	7.972281	7.991536	8.010370	8.028799	8.046842	8.064513	32
29	15 890998	912136	932768	952917	972606	991853	010680	029103	047139	064805	31
30	30 891354	912484	933108	953249	972930	992171	010990	029407	047437	065096	30
31	45 891711	912832	933447	953581	973254	992488	011300	029710	047734	065387	29
	8′	23′	38′	53′	8′	23′	38′	53′	8′	23′	
32	0 7.892067	7.913179	7.933787	7.953912	7.973578	7.992805	8.011611	8.030014	8.048031	8.065679	28
33	15 892423	913527	934126	954244	973902	993122	011920	030317	048329	065970	27
34	30 892779	913874	934465	954575	974226	993438	012230	030621	048626	066261	26
35	45 893135	914222	934804	954906	974550	993755	012540	030924	048922	066552	25
	9′	24′	39′	54′	9′	24′	39′	54′	9′	24′	
36	0 7.893491	7.914569	7.935143	7.955238	7.974873	7.994071	8.012850	8.031227	8.049219	8.066842	24
37	15 893846	914916	935482	955568	975197	994388	013159	031530	049516	067133	23
38	30 894202	915262	935821	955899	975520	994704	013469	031833	049813	067424	22
39	45 894557	915609	936159	956230	975844	995020	013778	032136	050109	067714	21
	10′	25′	40′	55′	10′	25′	40′	55′	10′	25′	
40	0 7.894912	7.915956	7.936497	7.956561	7.976167	7.995336	8.014087	8.032438	8.050405	8·068004	20
41	15 895267	916302	936836	956891	976490	995652	014396	032741	050702	068295	19
42	30 895622	916648	937174	957221	976813	995968	014705	033043	050998	068585	18
43	45 895977	916994	937512	957552	977135	996283	015014	033346	051294	068875	17
	11′	26′	41′	56′	11′	26′	41′	56′	11′	26′	
44	0 7·896331	7.917341	7.937850	7.957882	7.977458	7.996599	8.015323	8.033648	8.051590	8.069165	16
45	15 896685	917686	938187	958213	977780	996914	015632	033950	051886	069455	15
46	30 897040	918032	938525	958541	978103	997230	015940	034252	052182	069745	14
47	45 897394	918378	938862	958871	978425	997545	016248	034554	052477	070034	13
	12′	27′	42′	57′	12′	27′	42′	57′	12′	27′	
48	0 7.897748	7.918723	7.939200	7.959201	7.978747	7.997860	8.016557	8.034856	8.052773	8.070324	12
49	15 898102	919068	939537	959530	979069	998175	016865	035157	053068	070613	11
50	30 898455	919414	939874	959859	979391	998490	017173	035459	053364	070903	10
51	45 898809	919759	940211	960189	979713	998804	017481	035760	053659	071192	9
	13′	28′	43′	58′	13′	28′	43′	58′	13′	28′	
52	0 7.899162	7.920103	7.940548	7.960518	7.980035	7.999119	8.017789	8.036062	8.053954	8.071481	8
53	15 899515	920448	940884	960847	980356	999434	018097	036363	054249	071770	7
54	30 899868	920793	941221	961175	980678	999748	018404	036664	054544	072059	6
55	45 900221	921137	941557	961504	980999	8.000062	018712	036965	054839	072348	5
	14′	29′	44′	59′	14′	29′	44′	59′	14′	29′	
56	0 7.900574	7.921482	7.941894	7.961833	7.981320	8.000376	8.019019	8.037266	8.055134	8.072637	4
57	15 900927	921826	942230	962161	981642	000690	019327	037567	055428	072926	3
58	30 901279	922170	942566	962489	981962	001004	019634	037868	055723	073215	2
59	45 901632	922514	942902	962818	982283	001318	019941	038169	056018	073503	1
60	60 7·901984	7.922858	7.943237	7.963146	7.982604	8.001632	8.020248	8.038469	8.056312	8.073792	0
sec.	19m	18m	17m	16m	15m	14m	13m	12m	11m	10m	sec.

0 Hours.				Log. Haversines.								0 Hours.	
	50m	51m	52m	53m	54m	55m	56m	57m	58m	59m		
	12 deg.			13 deg.				14 deg.				
sec.	″	30′	45′	0′	15′	30′	45′	0′	15′	30′	45′	sec.
0	0	8.073792	8.090922	8.107718	8.124190	8.140352	8.156215	8.171789	8.187085	8.202112	8.216879	60
1	15	074080	091205	107995	124462	140619	156477	172046	187337	202360	217123	59
2	30	074368	091487	108272	124734	140886	156739	172303	187590	202608	217367	58
3	45	074656	091770	108549	125005	141152	157000	172560	187842	202856	217611	57
		31′	46′	1′	16′	31′	46′	1′	16′	31′	46′	
4	0	8.074944	8.092052	8.108826	8.125277	8.141419	8.157262	8.172817	8.188095	8.203104	8.217854	56
5	15	075232	092334	109102	125549	141685	157524	173074	188347	203352	218098	55
6	30	075520	092617	109379	125820	141952	157785	173331	188599	203600	218342	54
7	45	075808	092899	109656	126091	142218	158046	173588	188851	203848	218585	53
		32′	47′	2′	17′	32′	47′	2′	17′	32′	47′	
8	0	8.076095	8.093181	8.109932	8.126363	8.142484	8.158308	8.173844	8.189104	8.204095	8.218829	52
9	15	076383	093463	110209	126634	142750	158569	174101	189356	204343	219072	51
10	30	076670	093744	110485	126905	143016	158830	174357	189608	204591	219316	50
11	45	076958	094026	110761	127176	143282	159091	174614	189859	204838	219559	49
		33′	48′	3′	18′	33′	48′	3′	18′	33′	48′	
12	0	8.077245	8.094308	8.111037	8.127447	8.143548	8.159352	8.174870	8.190111	8.205086	8.219802	48
13	15	077532	094589	111314	127718	143814	159613	175126	190363	205333	220045	47
14	30	077819	094871	111590	127989	144080	159874	175382	190615	205580	220288	46
15	45	078106	095152	111865	128259	144345	160135	175639	190866	205827	220531	45
		34′	49′	4′	19′	34′	49′	4′	19′	34′	49′	
16	0	8.078393	8.095433	8.112141	8.128530	8.144611	8.160396	8.175895	8.191118	8.206075	8.220774	44
17	15	078680	095714	112417	128800	144876	160656	176151	191369	206322	221017	43
18	30	078967	095995	112693	129071	145142	160917	176406	191621	206569	221260	42
19	45	079253	096276	112968	129341	145407	161177	176662	191872	206816	221503	41
		35′	50′	5′	20′	35′	50′	5′	20′	35′	50′	
20	0	8.079540	8.096557	8.113244	8.129611	8.145672	8.161438	8.176918	8.192123	8.207062	8.221745	40
21	15	079826	096838	113519	129882	145937	161698	177174	192374	207309	221988	39
22	30	080113	097119	113794	130152	146203	161958	177429	192625	207556	222230	38
23	45	080399	097399	114069	130422	146468	162218	177685	192876	207803	222473	37
		36′	51′	6′	21′	36′	51	6′	21′	36′	51′	
24	0	8.080685	8.097680	8.114345	8.130692	8.146733	8.162479	8.177940	8.193127	8.208049	8.222715	36
25	15	080971	097960	114620	130961	146997	162738	178195	193378	208296	222957	35
26	30	081257	098241	114895	131231	147262	162998	178451	193629	208542	223200	34
27	45	081543	098521	115169	131501	147527	163258	178706	193879	208788	223442	33
		37′	52′	7′	22′	37′	52′	7′	22′	37′	52′	
28	0	8.081828	8.098801	8.115444	8.131770	8.147791	8.163518	8.178961	8.194130	8.209035	8.223684	32
29	15	082114	099081	115719	132040	148056	163778	179216	194381	209281	223926	31
30	30	082400	099361	115993	132309	148320	164037	179471	194631	209527	224168	30
31	45	082685	099641	116268	132579	148585	164297	179726	194881	209773	224410	29
		38′	53′	8′	23′	38′	53′	8′	23′	38′	53′	
32	0	8.082970	8.099921	8.116542	8.132848	8.148849	8.164556	8.179981	8.195132	8.210019	8.224652	28
33	15	083256	100200	116817	133117	149113	164816	180235	195382	210265	224893	27
34	30	083541	100480	117091	133386	149377	165075	180490	195632	210511	225135	26
35	45	083826	100759	117365	133655	149641	165334	180745	195882	210757	225377	25
		39′	54′	9′	24′	39′	54′	9′	24′	39′	54′	
36	0	8.084111	8.101039	8.117639	8.133924	8.149905	8.165593	8.180999	8.196132	8.211003	8.225618	24
37	15	084396	101318	117913	134193	150169	165852	181254	196382	211248	225860	23
38	30	084681	101597	118187	134461	150433	166111	181508	196632	211494	226101	22
39	45	084965	101876	118461	134730	150696	166370	181762	196882	211739	226343	21
		40′	55′	10′	25′	40′	55′	10′	25′	40′	55′	
40	0	8.085250	8.102156	8.118734	8.134999	8.150960	8.166629	8.182016	8.197132	8.211985	8.226584	20
41	15	085534	102434	119008	135267	151223	166888	182270	197382	212230	226825	19
42	30	085819	102713	119282	135535	151487	167146	182525	197631	212475	227066	18
43	45	086103	102992	119555	135804	151750	167405	182778	197881	212721	227307	17
		41′	56′	11′	26′	41′	56′	11′	26′	41′	56′	
44	0	8.086387	8.103271	8.119828	8.136072	8.152013	8.167663	8.183032	8.198130	8.212966	8.227548	16
45	15	086671	103549	120102	136340	152277	167922	183286	198380	213211	227789	15
46	30	086956	103828	120375	136608	152540	168180	183540	198629	213456	228030	14
47	45	087239	104106	120648	136876	152803	168439	183794	198878	213701	228271	13
		42′	57′	12′	27′	42′	57′	12′	27′	42′	57′	
48	0	8.087523	8.104385	8.120921	8.137144	8.153066	8.168697	8.184047	8.199127	8.213946	8.228512	12
49	15	087807	104663	121194	137412	153328	168955	184301	199376	214191	228752	11
50	30	088091	104941	121467	137680	153591	169213	184554	199625	214435	228993	10
51	45	088374	105219	121739	137947	153854	169471	184808	199874	214680	229234	9
		43′	58′	13′	28′	43′	58′	13′	28′	43′	59′	
52	0	8.088658	8.105497	8.122012	8.138215	8.154117	8.169729	8.185061	8.200123	8.214925	8.229474	8
53	15	088941	105775	122285	138482	154379	169986	185314	200372	215169	229714	7
54	30	089224	106053	122557	138750	154642	170244	185567	200621	215414	229955	6
55	45	089508	106330	122829	139017	154904	170502	185820	200869	215658	230195	5
		44′	59′	14′	29′	44′	59′	14′	29′	44′	59′	
56	0	8.089791	8.106608	8.123102	8.139284	8.155166	8.170759	8.186073	8.201118	8.215902	8.230435	4
57	15	090074	106885	123374	139551	155429	171017	186326	201366	216147	230675	3
58	30	090357	107163	123646	139818	155691	171274	186579	201615	216391	230915	2
59	45	090639	107440	123918	140085	155953	171532	186832	201863	216635	231155	1
60	60	8.090922	8.107718	8.124190	8.140352	8.156215	8.171789	8.187085	8.202112	8.216879	8.231395	0
sec.		9m	8m	7m	6m	5m	4m	3m	2m	1m	0m	sec.

1 Hour.	Log. Haversines.								1 Hour.	
	0m	1m	2m	3m	4m	5m	6m	7m	8m	9m
sec.	15 deg.				16 deg.				17 deg	sec.
"	0′	15′	30′	45′	0′	15′	30′	45′	0′	15′	
0	0 8.231395	8.245669	8.259708	8.273519	8.287111	8.300488	8.313659	8.326629	8.339404	8.351990	60
1	15 231635	245905	259940	273748	287335	300710	313877	326844	339615	352198	59
2	30 231875	246141	260172	273976	287560	300931	314095	327058	339827	352406	58
3	45 232115	246376	260404	274204	287784	301152	314312	327272	340038	352614	57
	1′	16′	31′	46′	1′	16′	31′	46′	1′	16′	
4	0 8.232354	8.246612	8.260636	8.274432	8.288009	8.301373	8.314530	8.327487	8.340249	8.352822	56
5	15 232594	246848	260867	274660	288233	301594	314747	327701	340460	353031	55
6	30 232833	247083	261099	274888	288458	301815	314965	327915	340671	353238	54
7	45 233073	247319	261331	275116	288682	302035	315182	328129	340882	353446	53
	2′	17′	32′	47′	2′	17′	32′	47′	2′	17′	
8	0 8.233312	8.247554	8.261562	8.275344	8.288906	8.302256	8.315400	8.328344	8.341093	8.353654	52
9	15 233552	247790	261794	275572	289131	302477	315617	328558	341304	353862	51
10	30 233791	248025	262025	275800	289355	302698	315835	328772	341515	354070	50
11	45 234030	248260	262257	276027	289579	302918	316052	328986	341726	354277	49
	3′	18′	33′	48′	3′	18′	33′	48′	3′	18′	
12	0 8.234269	8.248495	8.262488	8.276255	8.289803	8.303139	8.316269	8.329200	8.341936	8.354485	48
13	15 234508	248730	262719	276483	290027	303359	316486	329413	342147	354692	47
14	30 234747	248965	262951	276710	290251	303580	316703	329627	342358	354900	46
15	45 234986	249200	263182	276938	290475	303800	316920	329841	342568	355107	45
	4′	19′	34′	49′	4′	19′	34′	49′	4′	19′	
16	0 8.235225	8.249435	8.263413	8.277165	8.290699	8.304021	8.317137	8.330055	8.342779	8.355315	44
17	15 235464	249670	263644	277392	290922	304241	317354	330268	342989	355522	43
18	30 235703	249905	263875	277620	291146	304461	317571	330482	343200	355730	42
19	45 235941	250140	264106	277847	291370	304681	317788	330695	343410	355937	41
	5′	20′	35′	50′	5′	20′	35′	50′	5′	20′	
20	0 8.236180	8.250374	8.264337	8.278074	8.291593	8.304901	8.318004	8.330909	8.343620	8.356144	40
21	15 236418	250609	264567	278301	291817	305121	318221	331122	343830	356351	39
22	30 236657	250843	264798	278528	292040	305341	318438	331336	344041	356558	38
23	45 236895	251078	265029	278755	292264	305561	318654	331549	344251	356766	37
	6′	21′	36′	51′	6′	21′	36′	51′	6′	21′	
24	0 8.237133	8.251312	8.265259	8.278982	8.292487	8.305781	8.318871	8.331762	8.344461	8.356973	36
25	15 237372	251547	265490	279209	292710	306001	319087	331975	344671	357180	35
26	30 237610	251781	265720	279436	292933	306221	319304	332189	344881	357386	34
27	45 237848	252015	265951	279662	293157	306440	319520	332402	345091	357593	33
	7′	22′	37′	52′	7′	23′	37′	52′	7′	22′	
28	0 8.238086	8.252249	8.266181	8.279889	8.293380	8.306660	8.319736	8.332615	8.345301	8.357800	32
29	15 238324	252483	266411	280115	293603	306880	319953	332828	345511	358007	31
30	30 238562	252717	266642	280342	293826	307099	320169	333041	345720	358214	30
31	45 238800	252951	266872	280568	294049	307319	320385	333254	345930	358420	29
	8′	23′	39′	53′	8′	23′	39′	53′	8′	23′	
32	0 8.239038	8.253185	8.267162	8.280795	8.294272	8.307538	8.320601	8.333466	8.346140	8.358627	28
33	15 239275	253419	267332	281021	294494	307757	320817	333679	346349	358833	27
34	30 239513	253653	267562	281248	294717	307977	321033	333892	346559	359040	26
35	45 239751	253886	267732	281474	294940	308196	321249	334105	346769	359246	25
	9′	24′	39′	54′	9′	24′	39′	54′	9′	24′	
36	0 8.239988	8.254120	8.268022	8.281700	8.295162	8.308415	8.321465	8.334317	8.346978	8.359453	24
37	15 240226	254354	268251	281926	295385	308634	321681	334530	347187	359659	23
38	30 240463	254587	268481	282152	295608	308853	321896	334742	347397	359866	22
39	45 240700	254820	268711	282378	295830	309073	322112	334955	347606	360072	21
	10′	25′	40′	55′	10′	25′	40′	55′	10′	25′	
40	0 8.240938	8.255054	8.268940	8.282604	8.296052	8.309291	8.322328	8.335167	8.347815	8.360278	20
41	15 241175	255287	269170	282830	296275	309510	322543	335379	348025	360484	19
42	30 241412	255520	269399	283056	296497	309729	322759	335592	348234	360690	18
43	45 241649	255754	269629	283282	296719	309948	322974	335804	348443	360896	17
	11′	26′	41′	56′	11′	26′	41′	56′	11′	26′	
44	0 8.241886	8.255987	8.269858	8.283507	8.296941	8.310167	8.323190	8.336016	8.348652	8.361102	16
45	15 242123	256220	270087	283733	297164	310385	323405	336225	348861	361309	15
46	30 242360	256453	270317	283959	297386	310604	323620	336440	349070	361514	14
47	45 242597	256686	270546	284184	297608	310823	323836	336652	349279	361720	13
	12′	27′	42′	57′	12′	27′	42′	57′	12′	27′	
48	0 8.242833	8.256919	8.270775	8.284410	8.297830	8.311041	8.324051	8.336864	8.349488	8.361926	12
49	15 243070	257151	271004	284635	298051	311260	324266	337076	349696	362132	11
50	30 243307	257384	271233	284860	298273	311478	324481	337288	349905	362338	10
51	45 243543	257617	271462	285086	298495	311696	324696	337500	350114	362543	9
	13′	28′	43′	58′	13′	28′	43′	58′	13′	28′	
52	0 8.243780	8.257849	8.271691	8.285311	8.298717	8.311915	8.324911	8.337712	8.350323	8.362749	8
53	15 244016	258082	271919	285536	298938	312133	325126	337924	350531	362954	7
54	30 244252	258314	272148	285761	299160	312351	325341	338135	350740	363160	6
55	45 244489	258547	272377	285986	299382	312569	325556	338347	350948	363365	5
	14′	29′	44′	59′	14′	29′	44′	59′	14′	29′	
56	0 8.244725	8.258779	8.272606	8.286211	8.299603	8.312787	8.325771	8.338558	8.351157	8.363571	4
57	15 244961	259011	272834	286436	299824	313005	325985	338770	351365	363776	3
58	30 245197	259244	273063	286661	300046	313223	326200	338981	351573	363981	2
59	45 245433	259476	273291	286886	300267	313441	326414	339193	351782	364187	1
60	60 8.245669	8.259708	8.273519	8.287111	8.300488	8.313659	8.326629	8.339404	8.351990	8.364392	0
sec.	59m	58m	57m	56m	55m	54m	53m	52m	51m	50m	sec.

1 Hour.	Log. Haversines.										1 Hour.
	10m	11m	12m	13m	14m	15m	16m	17m	18m	19m	
	17 deg.		18 deg.				19 deg.				
sec.	″	30′	45′	0′	15′	30′	45′	0′	15′	30′	45′	sec.
0	0	8.364392	8.376615	8.388665	8.400546	8.412262	8.423818	8.435218	8.446467	8.457568	8.468524	60
1	15	364597	376817	388864	400742	412456	424009	435407	446653	457752	468706	59
2	30	364802	377020	389064	400939	412650	424201	435596	446839	457935	468887	58
3	45	365007	377222	389263	401135	412843	424392	435784	447026	458119	469068	57
		31′	46′	1′	16′	31′	46′	1′	16′	31′	46′	
4	0	8.365212	8.377424	8.389462	8.401332	8.413037	8.424583	8.435973	8.447212	8.458303	8.469250	56
5	15	365417	377626	389661	401528	413231	424774	436162	447398	458486	469431	55
6	30	365622	377828	389860	401724	413425	424965	436350	447584	458670	469612	54
7	45	365827	378030	390060	401921	413618	425156	436539	447770	458853	469793	53
		32′	47′	2′	17′	32′	47′	2′	17′	32′	47′	
8	0	8.366032	8.378232	8.390259	8.402117	8.413812	8.425347	8.436727	8.447956	8.459037	8.469975	52
9	15	366237	378434	390458	402313	414005	425538	436915	448142	459220	470156	51
10	30	366441	378635	390657	402510	414199	425729	437104	448327	459404	470337	50
11	45	366646	378837	390855	402706	414392	425920	437292	448513	459587	470518	49
		33′	48′	3′	18′	33′	48′	3′	18′	33′	48′	
12	0	8.366851	8.379039	8.391054	8.402902	8.414586	8.426110	8.437480	8.448699	8.459771	8.470699	48
13	15	367055	379241	391253	403098	414779	426301	437668	448885	459954	470880	47
14	30	367260	379442	391452	403294	414972	426492	437857	449070	460137	471061	46
15	45	367464	379644	391651	403490	415166	426682	438045	449256	460320	471241	45
		34′	49′	4′	19′	34′	49′	4′	19′	34′	49′	
16	0	8.367669	8.379845	8.391849	8.403686	8.415359	8.426873	8.438233	8.449442	8.460504	8.471422	44
17	15	367873	380047	392048	403882	415552	427064	438421	449627	460687	471603	43
18	30	368077	380248	392247	404077	415745	427254	438609	449813	460870	471784	42
19	45	368282	380450	392445	404273	415938	427445	438797	449998	461053	471965	41
		35′	50′	5′	20′	35′	50′	5′	20′	35′	50′	
20	0	8.368486	8.380651	8.392644	8.404469	8.416131	8.427635	8.438985	8.450184	8.461236	8.472145	40
21	15	368690	380852	392842	404665	416324	427826	439172	450369	461419	472326	39
22	30	368894	381053	393040	404860	416517	428016	439360	450554	461602	472506	38
23	15	369098	381255	393239	405056	416710	428206	439548	450740	461785	472687	37
		36′	51′	6′	21′	36′	51′	6′	21′	36′	51′	
24	0	8.369302	8.381456	8.393437	8.405252	8.416903	8.428397	8.439736	8.450925	8.461968	8.472868	36
25	15	369506	381657	393635	405447	417096	428587	439924	451110	462150	473048	35
26	30	369710	381858	393834	405643	417289	428777	440111	451295	462333	473228	34
27	45	369914	382059	394032	405838	417482	428967	440299	451480	462516	473409	33
		37′	52′	7′	22′	37′	52′	7′	22′	37′	52′	
28	0	8.370118	8.382260	8.394230	8.406033	8.417674	8.429157	8.440486	8.451666	8.462699	8.473589	32
29	15	370322	382461	394428	406229	417867	429347	440674	451851	462881	473770	31
30	30	370526	382661	394626	406424	418060	429537	440862	452036	463064	473950	30
31	45	370729	382862	394824	406619	418252	429727	441049	452221	463247	474130	29
		38′	53′	8′	23′	38′	53′	8′	23′	38′	53′	
32	0	8.370933	8.383063	8.395022	8.406814	8.418445	8.429917	8.441236	8.452406	8.463429	8.474310	28
33	15	371137	383264	395220	407010	418637	430107	441424	452591	463612	474490	27
34	30	371340	383464	395418	407205	418830	430297	441611	452775	463794	474671	26
35	45	371544	383665	395615	407400	419022	430487	441798	452960	463976	474851	25
		39′	54′	9′	24′	39′	54′	9′	24′	39′	54′	
36	0	8.371747	8.383866	8.395813	8.407595	8.419214	8.430677	8.441986	8.453145	8.464159	8.475031	24
37	15	371950	384066	396011	407790	419407	430866	442173	453330	464341	475211	23
38	30	372154	384267	396209	407985	419599	431056	442360	453515	464524	475391	22
39	45	372357	384467	396406	408180	419791	431246	442547	453699	464706	475571	21
		40′	55′	10′	25′	40′	55′	10′	25′	40′	55′	
40	0	8.372560	8.384667	8.396604	8.408374	8.419983	8.431435	8.442734	8.453884	8.464888	8.475751	20
41	15	372764	384868	396801	408569	420176	431625	442921	454068	465070	475930	19
42	30	372967	385068	396999	408764	420368	431814	443108	454253	465252	476110	18
43	45	373170	385268	397196	408959	420560	432004	443295	454437	465434	476290	17
		41′	56′	11′	26′	41′	56′	11′	26′	41′	56′	
44	0	8.373373	8.385468	8.397394	8.409153	8.420752	8.432193	8.443482	8.454622	8.465617	8.476470	16
45	15	373576	385668	397591	409348	420944	432383	443669	454806	465799	476649	15
46	30	373779	385869	397788	409542	421136	432572	443856	454991	465981	476829	14
47	45	373982	386069	397985	409737	421328	432761	444043	455175	466162	477009	13
		42′	57′	12′	27′	42′	57′	12′	27′	42′	57′	
48	0	8.374185	8.386269	8.398183	8.409931	8.421519	8.432951	8.444229	8.455359	8.466344	8.477188	12
49	15	374387	386469	398380	410126	421711	433140	444416	455544	466526	477368	11
50	30	374590	386668	398577	410320	421903	433329	444603	455728	466708	477547	10
51	45	374793	386868	398774	410515	422095	433518	444789	455912	466890	477727	9
		43′	58′	13′	28′	43′	58′	13′	28′	43′	58′	
52	0	8.374996	8.387068	8.398971	8.410709	8.422286	8.433707	8.444976	8.456096	8.467072	8.477906	8
53	15	375198	387268	399168	410903	422478	433896	445162	456280	467253	478086	7
54	30	375401	387468	399365	411097	422669	434085	445349	456464	467435	478265	6
55	45	375603	387667	399562	411292	422861	434274	445535	456648	467617	478444	5
		44′	59′	14′	29′	44′	59′	14′	29′	44′	59′	
56	0	8.375806	8.387867	8.399759	8.411486	8.423053	8.434463	8.445722	8.456832	8.467798	8.478624	4
57	15	376008	388066	399955	411680	423244	434652	445908	457016	467980	478803	3
58	30	376211	388266	400152	411874	423435	434841	446095	457200	468162	478982	2
59	45	376413	388465	400349	412068	423627	435030	446281	457384	468343	479161	1
60	60	8.376615	8.388665	8.400546	8.412262	8.423818	8.435218	8.446467	8.457568	8.468524	8.479340	0
sec.		49m	48m	47m	46m	45m	44m	43m	42m	41m	40m	sec.

1 Hour.	Log. Haversines.										1 Hour.
	20m	21m	22m	23m	24m	25m	26m	27m	28m	29m	
sec.	20 deg.				21 deg.				22 deg.		sec.
	° 0′	15′	30′	45′	0′	15′	30′	45′	0′	15′	
0	0 8.479340	8.490019	8.500564	8.510979	8.521266	8.531429	8.541470	8.551392	8.561198	8.570890	60
1	15 479519	490196	500739	511151	521436	531597	541636	551556	561360	571051	59
2	30 479699	490373	500914	511324	521607	531765	541802	551720	561523	571211	58
3	45 479878	490550	501088	511496	521777	531934	541968	551885	561685	571372	57
	1′	16′	31′	46′	1′	16′	31′	46′	1′	16′	
4	0 8.480057	8.490726	8.501263	8.511669	8.521947	8.532102	8.542135	8.552049	8.561847	8.571532	56
5	15 480235	490903	501437	511841	522118	532270	542301	552213	562010	571693	55
6	30 480414	491080	501612	512013	522288	532438	542467	552378	562172	571853	54
7	45 480593	491256	501786	512186	522458	532606	542633	552542	562334	572014	53
	2′	17′	32′	47′	2′	17′	32′	47′	2′	17′	
8	0 8.480772	8.491433	8.501961	8.512358	8.522628	8.532774	8.542799	8.552706	8.562497	8.572174	52
9	15 480951	491610	502135	512530	522798	532942	542965	552870	562659	572334	51
10	30 481130	491786	502309	512702	522968	533111	543131	553034	562821	572495	50
11	45 481308	491963	502483	512874	523138	533278	543297	553198	562983	572655	49
	3′	18′	33′	48′	3′	18′	33′	48′	3′	18′	
12	0 8.481487	8.492139	8.502658	8.513047	8.523308	8.533446	8.543463	8.553362	8.563145	8.572815	48
13	15 481666	492315	502832	513219	523478	533614	543629	553526	563307	572975	47
14	30 481844	492492	503006	513391	523648	533782	543795	553690	563469	573136	46
15	45 482023	492668	503180	513563	523818	533950	543961	553854	563631	573296	45
	4′	19′	34′	49′	4′	19′	34′	49′	4′	19′	
16	0 8.482201	8.492844	8.503354	8.513735	8.523988	8.534118	8.544127	8.554018	8.563793	8.573456	44
17	15 482380	493021	503528	513906	524158	534286	544293	554182	563955	573616	43
18	30 482558	493197	503702	514078	524328	534454	544459	554346	564117	573776	42
19	45 482737	493373	503876	514250	524497	534621	544624	554509	564279	573936	41
	5′	20′	35′	50′	5′	20′	35′	50′	5′	20′	
20	0 8.482915	8.493549	8.504050	8.514422	8.524667	8.534789	8.544790	8.554673	8.564441	8.574096	40
21	15 483093	493725	504224	514594	524837	534957	544956	554837	564603	574256	39
22	30 483272	493901	504398	514766	525007	535124	545121	555001	564765	574416	38
23	45 483450	494077	504572	514937	525176	535292	545287	555164	564926	574576	37
	6′	21′	36′	51′	6′	21′	36′	51′	6′	21′	
24	0 8.483628	8.494253	8.504746	8.515109	8.525346	8.535459	8.545453	8.555328	8.565088	8.574736	36
25	15 483808	494429	504920	515281	525515	535627	545618	555491	565250	574896	35
26	30 483985	494605	505093	515452	525685	535795	545784	555655	565412	575056	34
27	45 484163	494781	505267	515624	525854	535962	545949	555819	565573	575215	33
	7′	22′	37′	52′	7′	22′	37′	52′	7′	22′	
28	0 8.484341	8.494957	8.505441	8.515795	8.526024	8.536129	8.546115	8.555982	8.565735	8.575375	32
29	15 484519	495133	505614	515967	526193	536297	546280	556146	565896	575535	31
30	30 484697	495308	505788	516138	526363	536464	546445	556309	566058	575695	30
31	45 484875	495484	505961	516310	526532	536631	546611	556472	566219	575854	29
	8′	23′	38′	53′	8′	23′	38′	53′	8′	23′	
32	0 8.485053	8.495660	8.506135	8.516481	8.526701	8.536799	8.546776	8.556636	8.566381	8.576014	28
33	15 485231	495835	506308	516652	526871	536966	546941	556799	566542	576173	27
34	30 485408	496011	506482	516824	527040	537133	547107	556963	566704	576333	26
35	45 485586	496187	506655	516995	527209	537300	547272	557126	566865	576493	25
	9′	24′	39′	54′	9′	24′	39′	54′	9′	24′	
36	0 8.485764	8.496362	8.506829	8.517166	8.527378	8.537468	8.547437	8.557289	8.567027	8.576652	24
37	15 485942	496538	507002	517338	527547	537635	547602	557452	567188	576812	23
38	30 486119	496713	507175	517509	527717	537802	547767	557615	567349	576971	22
39	45 486297	496889	507349	517680	527886	537969	547932	557779	567510	577130	21
	10′	25′	40′	55′	10′	25′	40′	55′	10′	25′	
40	0 8.486475	8.497064	8.507522	8.517851	8.528055	8.538136	8.548097	8.557942	8.567672	8.577290	20
41	15 486652	497239	507695	518022	528224	538302	548262	558105	567833	577449	19
42	30 486830	497415	507868	518193	528393	538470	548427	558268	567994	577609	18
43	45 487007	497590	508041	518364	528562	538637	548592	558431	568155	577768	17
	11′	26′	41′	56′	11′	26′	41′	56′	11′	26′	
44	0 8.487185	8.497765	8.508214	8.518535	8.528731	8.538804	8.548757	8.558594	8.568316	8.577927	16
45	15 487362	497939	508387	518706	528899	538971	548922	558757	568477	578086	15
46	30 487540	498116	508560	518877	529068	539137	549087	558920	568639	578246	14
47	45 487717	498291	508733	519048	529237	539304	549252	559083	568800	578405	13
	12′	27′	42′	57′	12′	27′	42′	57′	12′	27′	
48	0 8.487894	8.498466	8.508906	8.519219	8.529406	8.539471	8.549417	8.559246	8 568961	8.578564	12
49	15 488072	498644	509079	519390	529575	539638	549581	559408	569121	578723	11
50	30 488249	498816	509252	519560	529743	539804	549746	559571	569282	578882	10
51	45 488426	498991	509425	519731	529912	539971	549911	559734	569443	579041	9
	13′	28′	43′	58′	13′	28′	43′	58′	13′	28′	
52	0 8.488603	8.499166	8.509598	8.519902	8.530081	8.540138	8.550076	8.559897	8.569604	8.579200	8
53	15 488780	499341	509771	520072	530249	540304	550240	560060	569765	579359	7
54	30 488958	499516	509943	520243	530418	540471	550405	560222	569926	579518	6
55	45 489135	499691	510116	520414	530586	540637	550569	560385	570087	579677	5
	14′	29′	44′	59′	14′	29′	44′	59′	14′	29′	
56	0 8.489312	8.499866	8.510289	8.520584	8.530755	8.540804	8.550734	8.560548	8.570247	8.579836	4
57	15 489489	500040	510461	520755	530923	540970	550898	560710	570408	579995	3
58	30 489666	500215	510634	520925	531092	541137	551063	560873	570569	580154	2
59	45 489842	500390	510806	521096	531260	541303	551227	561035	570729	580313	1
60	60 8.490019	8.500564	8.510979	8.521266	8.531429	8.541470	8.551392	8.561198	8.570890	8.580471	0
sec.	39m	38m	37m	36m	35m	34m	33m	32m	31m	30m	sec.

1 Hour.	Log. Haversines.										1 Hour.	
	30m	31m	32m	33m	34m	35m	36m	37m	38m	39m		
	22 deg.		23 deg.				24 deg.					
sec.	″	30′	45′	0′	15′	30′	45′	0′	15′	30′	45′	sec.
0	0	8.580471	8.589944	8.599311	8.608573	8.617734	8.626795	8.635758	8.644625	8.653399	8.662081	60
1	15	580630	590101	599466	608727	617885	626945	635906	644772	653545	662225	59
2	30	580789	590258	599621	608880	618037	627095	636055	644919	653690	662369	58
3	45	580948	590415	599776	609033	618189	627245	636203	645066	653836	662513	57
		31′	46′	1′	16′	31′	46′	1′	16′	31′	46′	
4	0	8.581106	8.590572	8.599931	8.609187	8.618341	8.627395	8.636352	8.645213	8.653981	8.662657	56
5	15	581265	590729	600086	609340	618492	627545	636500	645360	654126	662801	55
6	30	581424	590886	600242	609494	618644	627695	636649	645507	654272	662945	54
7	45	581582	591042	600396	609647	618796	627845	636797	645654	654417	663088	53
		32′	47′	2′	17′	32′	47′	2′	17′	32′	47′	
8	0	8.581741	8.591199	8.600552	8.609800	8.618947	8.627995	8.636946	8.645801	8.654562	8.663232	52
9	15	581899	591356	600706	609954	619099	628145	637094	645947	654707	663376	51
10	30	582058	591513	600862	610107	619251	628295	637242	646094	654853	663520	50
11	45	582216	591669	601016	610260	619402	628445	637391	646241	654998	663663	49
		33′	48′	3′	18′	33′	48′	3′	18′	33′	48′	
12	0	8.582375	8.591826	8.601171	8.610413	8.619554	8.628595	8.637539	8.646388	8.655143	8.663807	48
13	15	582533	591982	601326	610566	619705	628745	637687	646534	655288	663951	47
14	30	582691	592139	601481	610720	619857	628895	637835	646681	655433	664094	46
15	45	582850	592296	601636	610873	620008	629044	637984	646828	655578	664238	45
		34′	49′	4′	19′	34′	49′	4′	19′	34′	49′	
16	0	8.583008	8.592452	8.601791	8.611026	8.620160	8.629194	8.638132	8.646974	8.655723	8.664381	44
17	15	583166	592609	601945	611179	620311	629344	638280	647121	655868	664525	43
18	30	583325	592765	602100	611332	620462	629494	638428	647267	656014	664668	42
19	45	583483	592922	602255	611485	620614	629643	638576	647414	656158	664812	41
		35′	50′	5′	20′	35′	50′	5′	20′	35′	50′	
20	0	8.583641	8.593078	8.602410	8.611638	8.620765	8.629793	8.638724	8.647560	8.656304	8.664955	40
21	15	583799	593234	602564	611791	620916	629943	638872	647707	656448	665099	39
22	30	583957	593391	602719	611944	621067	630092	639020	647853	656593	665242	38
23	45	584115	593547	602873	612097	621219	630242	639168	648000	656738	665386	37
		36′	51′	6′	21′	36′	51′	6′	21′	36′	51′	
24	0	8.584273	8.593703	8.603028	8.612249	8.621370	8.630391	8.639316	8.648146	8.656883	8.665529	36
25	15	584431	593860	603182	612402	621521	630541	639464	648292	657028	665672	35
26	30	584589	594016	603337	612555	621672	630691	639612	648439	657173	665816	34
27	45	584747	594172	603491	612708	621823	630840	639760	648585	657317	665959	33
		37′	52′	7′	22′	37′	52′	7′	22′	37′	52′	
28	0	8.584905	8.594328	8.603646	8.612861	8.621974	8.630989	8.639908	8.648731	8.657462	8.666102	32
29	15	585063	594484	603800	613013	622125	631139	640056	648878	657607	666245	31
30	30	585221	594641	603955	613166	622276	631288	640203	649024	657752	666389	30
31	45	585379	594797	604109	613319	622427	631438	640351	649170	657896	666532	29
		38′	53′	8′	23′	38′	53′	8′	23′	38′	53′	
32	0	8.585537	8.594953	8.604263	8.613471	8.622578	8.631587	8.640499	8.649316	8.658041	8.666675	28
33	15	585695	595109	604418	613624	622729	631736	640647	649463	658186	666818	27
34	30	585853	595265	604572	613776	622880	631886	640794	649609	658330	666961	26
35	45	586010	595421	604726	613929	623031	632035	640942	649755	658475	667104	25
		39′	54′	9′	24′	39′	54′	9′	24′	39′	54′	
36	0	8.586168	8.595577	8.604880	8.614081	8.623182	8.632184	8.641090	8.649901	8.658620	8.667247	24
37	15	586326	595733	605035	614234	623333	632333	641237	650047	658764	667390	23
38	30	586483	595888	605189	614386	623484	632482	641385	650193	658909	667533	22
39	45	586641	596044	605343	614539	623634	632632	641532	650339	659053	667676	21
		40′	55′	10′	25′	40′	55′	10′	25′	40′	55′	
40	0	8.586799	8.596200	8.605497	8.614691	8.623785	8.632781	8.641680	8.650485	8.659198	8.667819	20
41	15	586956	596356	605651	614844	623936	632930	641828	650631	659342	667962	19
42	30	587114	596512	605805	614996	624087	633079	641975	650777	659486	668105	18
43	45	587271	596667	605959	615148	624237	633228	642123	650923	659631	668248	17
		41′	56′	11′	26′	41′	56′	11′	26′	41′	56′	
44	0	8.587429	8.596823	8.606113	8.615301	8.624388	8.633377	8.642270	8.651069	8.659775	8.668391	16
45	15	587586	596979	606267	615453	624539	633526	642417	651214	659919	668534	15
46	30	587743	597135	606421	615605	624689	633675	642565	651360	660064	668677	14
47	45	587901	597290	606575	615757	624840	633824	642712	651506	660208	668819	13
		42′	57′	12′	27′	42′	57′	12′	27′	42′	57′	
48	0	8.588058	8.597446	8.606729	8.615910	8.624990	8.633973	8.642859	8.651652	8.660352	8.668962	12
49	15	588215	597601	606883	616062	625141	634122	643007	651798	660497	669105	11
50	30	588373	597757	607036	616214	625291	634271	643154	651943	660641	669248	10
51	45	588530	597912	607190	616366	625442	634419	643301	652089	660785	669390	9
		43′	58′	13′	28′	43′	58′	13′	28′	43′	59′	
52	0	8.588687	8.598068	8.607344	8.616518	8.625592	8.634568	8.643449	8.652235	8.660929	8.669533	8
53	15	588844	598223	607498	616670	625742	634717	643596	652380	661073	669676	7
54	30	589002	598378	607651	616822	625893	634866	643743	652526	661217	669818	6
55	45	589159	598534	607805	616974	626043	635014	643890	652672	661361	669961	5
		44′	59′	14′	29′	44′	59′	14′	29′	44′	59′	
56	0	8.589316	8.598689	8.607959	8.617126	8.626194	8.635163	8.644037	8.652817	8.661505	8.670103	4
57	15	589473	598845	608112	617278	626344	635312	644184	652963	661649	670246	3
58	30	589630	599000	608266	617430	626494	635461	644331	653108	661793	670389	2
59	45	589787	599155	608419	617582	626644	635609	644478	653254	661937	670531	1
60	0	8.589944	8.599311	8.608573	8.617734	8.626795	8.635758	8.644625	8.653399	8.662081	8.670674	0
sec.		29m	28m	27m	26m	25m	24m	23m	22m	21m	20m	sec.

1 Hour.		Log. Haversines.								1 Hour.		
		40m	41m	42m	43m	44m	45m	46m	47m	48m	49m	
		25 deg.				26 deg.				27 deg.		
m.	"	0′	15′	30′	45′	0′	15′	30′	45′	0′	15′	m.
0	0	8.670674	8.679177	8.687595	8.695927	8.704176	8.712343	8.720431	8.728439	8.736371	8.744226	60
1	15	670816	679318	687734	696065	704313	712479	720565	728572	736502	744356	59
2	30	670958	679459	687874	696203	704450	712614	720699	728705	736634	744486	58
3	45	671101	679600	688013	696341	704586	712750	720833	728838	736765	744617	57
		1′	16′	31′	46′	1′	16′	31′	46′	1′	16′	
4	0	8.671243	8.679741	8.688153	8.696479	8.704723	8.712885	8.720967	8.728970	8.736897	8.744747	56
5	15	671385	679882	688292	696618	704860	713020	721101	729103	737028	744877	55
6	30	671528	680023	688432	696756	704996	713156	721235	729236	737159	745007	54
7	45	671670	680164	688571	696894	705133	713291	721369	729368	737291	745137	53
		2′	17′	32′	47′	2′	17′	32′	47′	2′	17′	
8	0	8.671812	8.680305	8.688710	8.697032	8.705270	8.713426	8.721503	8.729501	8.737422	8.745268	52
9	15	671955	680445	688850	697170	705406	713562	721637	729634	737554	745398	51
10	30	672097	680586	688989	697308	705543	713697	721771	729766	737685	745528	50
11	45	672239	680727	689128	697445	705679	713832	721905	729899	737816	745658	49
		3′	18′	33′	48′	3′	18′	33′	48′	3′	18′	
12	0	8.672381	8.680868	8.689268	8.697583	8.705816	8.713967	8.722039	8.730032	8.737948	8.745788	48
13	15	672523	681008	689407	697721	705952	714102	722172	730164	738079	745918	47
14	30	672666	681149	689546	697859	706089	714238	722306	730297	738210	746048	46
15	45	672808	681290	689685	697997	706225	714373	722440	730429	738341	746178	45
		4′	19′	34′	49′	4′	19′	34′	49′	4′	19′	
16	0	8.672950	8.681430	8.689825	8.698135	8.706362	8.714508	8.722574	8.730562	8.738473	8.746308	44
17	15	673092	681571	689964	698273	706498	714643	722708	730694	738604	746438	43
18	30	673234	681711	690103	698410	706635	714778	722841	730827	738735	746568	42
19	45	673376	681852	690242	698548	706771	714913	722975	730959	738866	746698	41
		5′	20′	35′	50′	5′	20′	35′	50′	5′	20′	
20	0	8.673518	8.681993	8.690381	8.698686	8.706908	8.715048	8.723109	8.731092	8.738997	8.746828	40
21	15	673660	682133	690520	698824	707044	715183	723242	731224	739128	746958	39
22	30	673802	682274	690660	698961	707180	715318	723376	731356	739260	747087	38
23	45	673944	682414	690799	699099	707316	715453	723510	731489	739391	747217	37
		6′	21′	36′	51′	6′	21′	36′	51′	6′	21′	
24	0	8.674086	8.682555	8.690938	8.699237	8.707453	8.715588	8.723643	8.731621	8.739522	8.747347	36
25	15	674227	682695	691077	699374	707589	715723	723777	731753	739653	747477	35
26	30	674369	682835	691216	699512	707725	715858	723911	731886	739784	747607	34
27	45	674511	682976	691354	699649	707861	715993	724044	732018	739915	747736	33
		7′	22′	37′	52′	7′	22′	37′	52′	7′	22′	
28	0	8.674653	8.683116	8.691493	8.699787	8.707998	8.716127	8.724178	8.732150	8.740046	8.747866	32
29	15	674795	683256	691632	699924	708134	716262	724311	732282	740177	747996	31
30	30	674936	683397	691771	700062	708270	716397	724445	732414	740308	748126	30
31	45	675078	683537	691910	700199	708406	716532	724578	732547	740438	748255	29
		8′	23′	38′	53′	8′	23′	38′	53′	8′	23′	
32	0	8.675220	8.683677	8.692049	8.700337	8.708542	8.716667	8.724712	8.732679	8.740569	8.748385	28
33	15	675361	683817	692188	700474	708678	716801	724845	732811	740700	748514	27
34	30	675503	683958	692327	700612	708814	716936	724978	732943	740831	748644	26
35	45	675645	684098	692465	700749	708950	717071	725112	733075	740962	748774	25
		9′	24′	39′	54′	9′	24′	39′	54′	9′	24′	
36	0	8.675786	8.684238	8.692604	8.700886	8.709086	8.717205	8.725245	8.733207	8.741093	8.748903	24
37	15	675928	684378	692743	701024	709222	717340	725378	733339	741223	749033	23
38	30	676069	684518	692881	701161	709358	717475	725512	733471	741354	749162	22
39	45	676211	684658	693020	701298	709494	717609	725645	733603	741485	749292	21
		10′	25′	40′	55′	10′	25′	40′	55′	10′	25′	
40	0	8.676352	8.684798	8.693159	8.701436	8.709630	8.717744	8.725778	8.733735	8.741616	8.749421	20
41	15	676494	684938	693297	701573	709766	717878	725912	733867	741746	749551	19
42	30	676635	685078	693436	701710	709902	718013	726045	733999	741877	749680	18
43	45	676777	685218	693575	701847	710038	718147	726178	734131	742008	749810	17
		11′	26′	41′	56′	11′	26′	41′	56′	11′	26′	
44	0	8.676918	8.685358	8.693713	8.701984	8.710173	8.718282	8.726311	8.734263	8.742138	8.749939	16
45	15	677060	685498	693852	702121	710309	718416	726444	734395	742269	750068	15
46	30	677201	685638	693990	702259	710445	718551	726578	734527	742400	750198	14
47	45	677342	685778	694129	702396	710581	718685	726711	734659	742530	750327	13
		12′	27′	42′	57′	12′	27′	42′	57′	12′	27′	
48	0	8.677484	8.685918	8.694267	8.702533	8.710716	8.718820	8.726844	8.734790	8.742661	8.750457	12
49	15	677625	686058	694406	702670	710852	718954	726977	734922	742791	750586	11
50	30	677766	686198	694544	702807	710988	719088	727110	735054	742922	750715	10
51	45	677907	686337	694682	702944	711123	719223	727243	735186	743052	750844	9
		13′	28′	43′	58′	13′	28′	43′	58′	13′	28′	
52	0	8.678049	8.686477	8.694821	8.703081	8.711259	8.719357	8.727376	8.735317	8.743183	8.750974	8
53	15	678190	686617	694959	703218	711395	719491	727509	735449	743313	751103	7
54	30	678331	686757	695097	703355	711530	719626	727642	735581	743444	751232	6
55	45	678472	686896	695236	703492	711666	719760	727775	735712	743574	751361	5
		14′	29′	44′	59′	14′	29′	44′	59′	14′	29′	
56	0	8.678613	8.687036	8.695374	8.703629	8.711801	8.719894	8.727908	8.735844	8.743705	8.751490	4
57	15	678754	687176	695512	703765	711937	720028	728041	735976	743835	751620	3
58	30	678895	687315	695651	703902	712073	720162	728174	736107	743965	751749	2
59	45	679036	687455	695789	704039	712208	720297	728306	736239	744096	751878	1
60	60	8.679177	8.687595	8.695927	8.704176	8.712343	8.720431	8.728439	8.736371	8.744226	8.752007	0
m.		19m	18m	17m	16m	15m	14m	13m	12m	11m	10m	m.

1 Hour.	Log. Haversines.										1 Hour.
	50m	51m	52m	53m	54m	55m	56m	57m	58m	59m	
	27 deg.		28 deg.				29 deg.				
sec.	′	30′	45′	0′	15′	30′	45′	0′	15′	30′	45′	sec.
0	0	8.752007	8.759715	8.767350	8.774916	8.782411	8.789839	8.797199	8.804494	8.811723	8.818889	60
1	15	752136	759842	767477	775041	782536	789962	797321	804615	811843	819008	59
2	30	752265	759970	767604	775167	782660	790085	797443	804736	811963	819127	58
3	45	752394	760098	767730	775292	782784	790208	797566	804857	812083	819246	57
		31′	46′	1′	16′	31′	46′	1′	16′	31′	46′	
4	0	8.752523	8.760226	8.767857	8.775417	8.782909	8.790332	8.797688	8.804978	8.812203	8.819365	56
5	15	752652	760353	767983	775543	783033	790455	797810	805099	812323	819484	55
6	30	752781	760481	768110	775668	783157	790578	797932	805220	812443	819602	54
7	45	752910	760609	768237	775794	783281	790701	798054	805341	812563	819721	53
		32′	47′	2′	17′	32′	47′	2′	17′	32′	47′	
8	0	8.753039	8.760737	8.768363	8.775919	8.783406	8.790824	8.798176	8.805461	8.812683	8.819840	52
9	15	753168	760864	768490	776044	783530	790947	798298	805582	812802	819959	51
10	30	753296	760992	768616	776170	783654	791070	798420	805703	812922	820078	50
11	45	753425	761120	768745	776295	783778	791193	798541	805824	813042	820196	49
		33′	48′	3′	18′	33′	48′	3′	18′	33′	48′	
12	0	8.753554	8.761247	8.768869	8.776420	8.783902	8.791316	8.798663	8.805945	8.813162	8.820315	48
13	15	753683	761375	768995	776545	784026	791439	798785	806066	813281	820434	47
14	30	753812	761503	769122	776671	784150	791562	798907	806186	813401	820552	46
15	45	753941	761630	769248	776796	784274	791685	799029	806307	813521	820671	45
		34′	49′	4′	19′	34′	49′	4′	19′	34′	49′	
16	0	8.754069	8.761758	8.769375	8.776921	8.784399	8.791808	8.799151	8.806428	8.813641	8.820790	44
17	15	754198	761885	769501	777046	784523	791931	799273	806549	813760	820908	43
18	30	754327	762013	769627	777172	784647	792054	799395	806669	813880	821027	42
19	45	754465	762140	769754	777297	784771	792177	799516	806790	813999	821145	41
		35′	50′	5′	20′	35′	50′	5′	20′	35′	50′	
20	0	8.754584	8.762268	8.769880	8.777422	8.784895	8.792300	8.799638	8.806911	8.814119	8.821264	40
21	15	754713	762395	770006	777547	785019	792423	799760	807031	814239	821382	39
22	30	754841	762523	770132	777672	785143	792545	799882	807152	814358	821501	38
23	15	754970	762650	770259	777797	785266	792668	800003	807273	814478	821619	37
		36′	51′	6′	21′	36′	51′	6′	21′	36′	51′	
24	0	8.755099	8.762777	8.770385	8.777922	8.785390	8.792791	8.800125	8.807393	8.814597	8.821738	36
25	15	755227	762905	770511	778047	785514	792914	800247	807514	814717	821856	35
26	30	755356	763032	770637	778172	785638	793037	800368	807635	814836	821975	34
27	45	755484	763159	770763	778297	785762	793159	800490	807755	814956	822093	33
		37′	52′	7′	22′	37′	52′	7′	22′	37′	52′	
28	0	8.755613	8.763287	8.770889	8.778422	8.785886	8.793282	8.800612	8.807876	8.815075	8.822212	32
29	15	755741	763414	771016	778547	786010	793405	800733	807996	815195	822330	31
30	30	755870	763541	771142	778672	786134	793527	800855	808117	815314	822449	30
31	45	755998	763669	771268	778797	786257	793650	800976	808237	815434	822567	29
		38′	53′	8′	23′	38′	53′	8′	23′	38′	53′	
32	0	8.756127	8.763796	8.771394	8.778922	8.786381	8.793773	8.801098	8.808358	8.815553	8.822685	28
33	15	756255	763923	771520	779047	786505	793895	801219	808478	815672	822804	27
34	30	756383	764050	771646	779172	786629	794018	801341	808598	815792	822922	26
35	45	756512	764177	771772	779296	786752	794140	801462	808719	815911	823040	25
		39′	54′	9′	24′	39′	54′	9′	24′	39′	54′	
36	0	8.756640	8.764305	8.771898	8.779421	8.786876	8.794263	8.801584	8.808839	8.816031	8.823159	24
37	15	756768	764432	772024	779546	787000	794386	801705	808960	816150	823277	23
38	30	756897	764559	772150	779671	787123	794508	801827	809080	816269	823395	22
39	45	757025	764686	772276	779796	787247	794631	801948	809200	816388	823513	21
		40′	55′	10′	25′	40′	55′	10′	25′	40′	55′	
40	0	8.757153	8.764813	8.772402	8.779920	8.787370	8.794753	8.802070	8.809321	8.816508	8.823632	20
41	15	757282	764940	772527	780045	787494	794876	802191	809441	816627	823750	19
42	30	757410	765067	772653	780170	787618	794998	802312	809561	816746	823868	18
43	45	757538	765194	772779	780294	787741	795121	802434	809682	816865	823986	17
		41′	56′	11′	26′	41	56′	11′	26′	41′	56′	
44	0	8.757666	8.765321	8.772905	8.780419	8.787865	8.795243	8.802555	8.809802	8.816985	8.824104	16
45	15	757794	765448	773031	780544	787988	795365	802676	809922	817104	824222	15
46	30	757923	765575	773157	780668	788112	795488	802798	810042	817223	824341	4
47	45	758051	765702	773282	780793	788235	795610	802919	810162	817342	824459	13
		42′	57′	12′	27′	42′	57′	12′	27′	42′	57′	
48	0	8.758179	8.765829	8.773408	8.780918	8.788359	8.795733	8.803040	8.810283	8.817461	8.824577	12
49	15	758307	765956	773534	781042	788482	795855	803161	810403	817580	824695	11
50	30	758435	766083	773660	781167	788606	795977	803283	810523	817699	824813	10
51	45	758563	766209	773785	781291	788729	796099	803404	810643	817818	824931	9
		43′	58′	13′	28′	43′	58′	13′	28′	43′	58′	
52	0	8.758691	8.766336	8.773911	8.781416	8.788852	8.796222	8.803525	8.810763	8.817938	8.825049	8
53	15	758819	766463	774037	781540	788976	796344	803646	810883	818056	825167	7
54	30	758947	766590	774162	781665	789099	796466	803767	811003	818176	825285	6
55	45	759075	766717	774288	781789	789222	796588	803888	811123	818295	825403	5
		44′	59′	14′	29′	44′	59′	14′	29′	44′	59′	
56	0	8.759203	8.766844	8.774413	8.781914	8.789346	8.796711	8.804010	8.811243	8.818414	8.825521	4
57	15	759331	766970	774539	782038	789469	796833	804131	811363	818532	825639	3
58	30	759459	767097	774664	782163	789592	796955	804252	811483	818651	825757	2
59	45	759587	767224	774790	782287	789716	797077	804373	811603	818770	825875	1
60	60	8.759715	8.767350	8.774916	8.782411	8.789839	8.797199	8.804494	8.811723	8.818889	8.825992	0
sec.		9m	8m	7m	6m	5m	4m	3m	2m	1m	0m	sec.

2 Hours. Log. Haversines. 2 Hours.

sec.	0m	1m	2m	3m	4m	5m	6m	7m	8m	9m	sec.
	30 deg				31 deg.				32 deg.		
	" 0′	15′	30′	45′	0′	15′	30′	45′	0′	15′	
0	0 8.8259928	8.833034	8.840015	8.846936	8.853798	8.860602	8.867349	8.874040	8.880676	8.887258	60
1	15 826110	833151	840130	847050	853912	860715	867461	874151	880786	887367	59
2	30 826228	833268	840246	847165	854025	860828	867573	874262	880896	887476	58
3	45 826346	833384	840362	847280	854139	860941	867685	874373	881006	887585	57
	1′	16′	31′	46′	1′	16′	31′	46′	1′	16′	
4	0 8.8264641	8.833501	8.840478	8.847395	8.854253	8.861053	8.867797	8.874484	8.881117	8.887694	56
5	15 826582	833618	840594	847510	854367	861166	867909	874595	881227	887804	55
6	30 826699	833735	840709	847624	854481	861279	868021	874706	881337	887913	54
7	45 826817	833851	840825	847739	854594	861392	868133	874817	881447	888022	53
	2′	17′	32′	47′	2′	17′	32′	47′	2′	17′	
8	0 8.8269351	8.833968	8.840941	8.847854	8.854708	8.861505	8.868245	8.874928	8.881557	8.888131	52
9	15 827053	834085	841056	847969	854822	861618	868356	875039	881667	888240	51
10	30 827170	834202	841172	848083	854936	861730	868468	875150	881777	888349	50
11	45 827288	834318	841289	848198	855049	861843	868580	875261	881887	888458	49
	3′	18′	33′	48′	3′	18′	33′	48′	3′	18′	
12	0 8.8274061	8.834435	8.841404	8.848313	8.855163	8.861956	8.868692	8.875372	8.881997	8.888567	48
13	15 827523	834551	841519	848427	855277	862069	868804	875483	882107	888676	47
14	30 827641	834668	841635	848542	855390	862181	868915	875594	882217	888786	46
15	45 827759	834785	841750	848656	855504	862294	869027	875704	882327	888895	45
	4′	19′	34′	49′	4′	19′	34′	49′	4′	19′	
16	0 8.8278761	8.834901	8 841866	8.848771	8.855618	8.862407	8.869139	8.875815	8.882436	8.889004	44
17	15 827994	835018	841981	848886	855731	862519	869251	875926	882546	889113	43
18	30 828111	835134	842097	849000	855845	862632	869362	876037	882656	889222	42
19	45 828229	835251	842213	849115	855959	862745	869474	876148	882766	889330	41
	5′	20′	35′	50′	5′	20′	35′	50′	5′	20′	
20	0 8.8283461	8.835367	8.842328	8.849229	8.856072	8.862857	8.869586	8.876258	8.882876	8.889439	40
21	15 828464	835484	842444	849344	856186	862970	869697	876369	882986	889548	39
22	30 828581	835600	842559	849458	856299	863082	869809	876480	883096	889657	38
23	45 828699	835717	842675	849573	856413	863195	869921	876590	883205	889766	37
	6′	21′	36′	51′	6′	21′	36′	51′	6′	21′	
24	0 8.8288161	8.835833	8.842790	8.849687	8.856526	8.863308	8.870032	8.876701	8.883315	8.889875	36
25	15 828934	835950	842905	849802	856640	863420	870144	876812	883425	889984	35
26	30 829051	836066	843021	849916	856753	863533	870255	876923	883535	890093	34
27	45 829169	836183	843136	850031	856867	863645	870367	877033	883644	890202	33
	7′	22′	37′	52′	7′	22′	37′	52′	7′	22′	
28	0 8.8292861	8.836299	8.843252	8.850145	8.856980	8.863758	8.870479	8.877144	8.883754	8.890311	32
29	15 829403	836415	843367	850259	857093	863870	870590	877254	883864	890419	31
30	30 829521	836532	843482	850374	857207	863983	870702	877365	883974	890528	30
31	45 829638	836648	843598	850488	857320	864095	870813	877476	884083	890637	29
	8′	23′	38′	53′	8′	23′	38′	53′	8′	23′	
32	0 8.8297561	8.836764	8.843713	8.850603	8.857434	8.864207	8.870925	8.877586	8.884193	8.890746	28
33	15 829873	836881	843828	850717	857547	864320	871036	877697	884303	890854	27
34	30 829990	836997	843944	850831	857660	864432	871148	877807	884412	890963	26
35	45 830107	837113	844059	850945	857774	864545	871259	877918	884522	891072	25
	9′	24′	39′	54′	9′	24′	39′	54′	9′	24′	
36	0 8.8302251	8.837230	8.844174	8.851060	8.857887	8.864657	8.871370	8.878028	8.884632	8.891181	24
37	15 830342	837346	844289	851174	858000	864769	871482	878139	884741	891289	23
38	30 830459	837462	844405	851288	858114	864882	871593	878249	884851	891398	22
39	45 830576	837578	844520	851403	858227	864994	871705	878360	884960	891507	21
	10′	25′	40′	55′	10′	25′	40′	55′	10′	25′	
40	0 8.8306941	8.837694	8.844635	8.851517	8.858340	8.865106	8.871816	8.878470	8.885070	8.891615	20
41	15 830811	837810	844750	851631	858453	865219	871927	878581	885179	891724	19
42	30 830928	837927	844865	851745	858567	865331	872039	878691	885289	891833	18
43	45 831045	838043	844981	851859	858680	865443	872150	878802	885398	891941	17
	11′	26′	41′	56′	11′	26′	41′	56′	11′	26′	
44	0 8.8311621	8.838159	8.845096	8.851973	8.858793	8.865555	8.872261	8.878912	8.885508	8.892050	16
45	15 831279	838275	845211	852088	858906	865668	872373	879022	885617	892158	15
46	30 831396	838391	845326	852202	859019	865780	872484	879133	885727	892267	14
47	45 831513	838507	845441	852316	859132	865892	872595	879243	885836	892376	13
	12′	27′	42′	57′	12′	27′	42′	57′	12′	27′	
48	0 8.8316301	8.838623	8.845556	8.852430	8.859246	8.866004	8.872706	8.879353	8.885946	8.892484	12
49	15 831748	838739	845671	852544	859359	866116	872818	879464	886055	892593	11
50	30 831865	838855	845786	852658	859472	866229	872929	879574	886164	892701	10
51	45 831982	838971	845901	852772	859585	866341	873040	879684	886274	892810	9
	13′	28′	43′	58′	13′	28′	43′	58′	13′	28′	
52	0 8.8320991	8.839087	8.846016	8.852886	8.859698	8.866453	8.873151	8.879795	8.886383	8.892918	8
53	15 832216	839203	846131	853000	859811	866565	873262	879905	886492	893027	7
54	30 832332	839319	846246	853114	859924	866677	873374	880015	886602	893135	6
55	45 832449	839435	846361	853228	860037	866789	873485	880125	886711	893243	5
	14′	29′	44′	59′	14′	29′	44′	59′	14′	29′	
56	0 8.8325661	8.839551	8.846476	8.853342	8.860150	8.866901	8.873596	8.880235	8.886821	8.893352	4
57	15 832683	839667	846591	853456	860263	867013	873707	880346	886930	893460	3
58	30 832800	839783	846706	853570	860376	867125	873818	880456	887039	893569	2
59	45 832917	839899	846821	853684	860489	867237	873929	880566	887148	893677	1
60	60 8.8330341	8.840015	8.846936	8.853798	8.860602	8.867349	8.874040	8.880676	8.887258	8.893785	0
sec.	59m	58m	57m	56m	55m	54m	53m	52m	51m	50m	sec.

21 Hours. 21 Hours.

2 Hours.		Log. Haversines.								2 Hours.	
	10m	11m	12m	13m	14m	15m	16m	17m	18m	19m	
sec.	32 deg.		33 deg.				34 deg.				sec.
	30'	45'	0'	15'	30'	45'	0'	15'	30'	45'	
0	0 8.893785	8.900261	8.906684	8.913055	8.919377	8.925648	8.931871	8.938045	8.944171	8.950251	60
1	15 893894	900368	906790	913161	919482	925752	931974	938147	944273	950351	59
2	30 894002	900475	906897	913267	919587	925856	932077	938250	944375	950452	58
3	45 894110	900583	907003	913373	919691	925960	932180	938352	944476	950553	57
	31'	46'	1'	16'	31'	46'	1'	13'	31'	46'	
4	0 8.894219	8.900690	8.907110	8.913478	8.919796	8.926065	8.932284	8.938455	8.944578	8.950654	56
5	15 894327	900798	907216	913584	919901	926169	932387	938557	944680	950755	55
6	30 894435	900905	907323	913690	920006	926273	932490	938660	944781	950856	54
7	45 894544	901013	907430	913795	920111	926377	932593	938762	944883	950957	53
	32'	47'	2'	17'	32'	47'	2'	17'	32'	47'	
8	0 8.894652	8.901120	8.907536	8.913901	8.920216	8.926481	8.932697	8.938864	8.944984	8.951058	52
9	15 894760	901227	907643	914007	920321	926585	932800	938967	945086	951158	51
10	30 894868	901335	907749	914112	920425	926689	932903	939069	945188	951259	50
11	45 894976	901442	907855	914218	920530	926793	933006	939171	945289	951360	49
	33'	48'	3'	18'	33'	48'	3'	18'	33'	48'	
12	0 8.895085	8.901549	8.907962	8.914324	8.920635	8.926897	8.933109	8.939274	8.945391	8.951461	48
13	15 895193	901657	908068	914429	920740	927000	933212	939376	945492	951562	47
14	30 895301	901764	908175	914535	920844	927104	933316	939479	945594	951662	46
15	45 895409	901871	908281	914640	920949	927208	933419	939581	945695	951763	45
	34'	49'	4'	19'	34'	49'	4'	19'	34'	49'	
16	0 8.895517	8.901978	8.908388	8.914746	8.921054	8.927312	8.933522	8.939683	8.945797	8 951864	44
17	15 895625	902086	908494	914852	921159	927416	933625	939785	945896	951965	43
18	30 895734	902193	908600	914957	921263	927520	933728	939888	946000	952065	42
19	45 895842	902300	908707	915063	921368	927624	933831	939990	946101	952166	41
	35'	50'	5'	20'	35'	50'	5'	20'	35'	50'	
20	0 8.895950	8.902407	8.908813	8.915168	8.921473	8.927728	8.933934	8.940092	8.946203	8.952267	40
21	15 896058	902514	908919	915274	921577	927832	934037	940194	946304	952367	39
22	30 896166	902622	909026	915379	921682	927935	934140	940297	946406	952468	38
23	45 896274	902729	909132	915484	921787	928039	934243	940399	946507	952569	37
	36'	51'	6'	21'	36'	51	6'	21'	36'	51'	
24	0 8.896382	8.902836	8.909238	8.915590	8.921891	8.928143	8.934346	8.940501	8.946609	8.952669	36
25	15 896490	902943	909345	915695	921996	928247	934449	940603	946710	952770	35
26	30 896598	903050	909451	915801	922100	928351	934552	940705	946811	952871	34
27	45 896706	903157	909557	915906	922205	928454	934655	940808	946913	952971	33
	37'	52'	7'	22'	37'	52'	7'	22'	37'	52'	
28	0 8.896814	8.903264	8.909663	8.916012	8.922310	8.928558	8.934758	8.940910	8.947014	8.953072	32
29	15 896922	903371	909770	916117	922414	928662	934861	941012	947115	953172	31
30	30 897030	903479	909876	916222	922519	928766	934964	941114	947217	953272	30
31	45 897137	903586	909982	916328	922623	928869	935067	941216	947318	953373	29
	38'	53'	8'	23'	38'	53'	8'	23'	38'	53'	
32	0 8.897245	8.903693	8.910088	8.916433	8.922728	8.928973	8.935170	8.941318	8.947419	8.953474	28
33	15 897353	903800	910194	916538	922832	929077	935272	941420	947521	953574	27
34	30 897461	903907	910301	916644	922937	929180	935375	941522	947622	953675	26
35	45 897569	904014	910407	916749	923041	929284	935478	941624	947723	953775	25
	39'	54'	9'	24'	39'	54'	9'	24'	39'	54'	
36	0 8.897677	8.904121	8.910513	8.916854	8.923146	8.929388	8.935581	8.941726	8.947824	8.953876	24
37	15 897785	904228	910619	916959	923250	929491	935684	941828	947926	953976	23
38	30 897892	904334	910725	917065	923354	929595	935787	941930	948027	954077	22
39	45 898000	904441	910831	917170	923459	929698	935889	942032	948128	954177	21
	40'	55'	10'	25'	40'	55'	10'	25'	40'	55'	
40	0 8.898108	8.904548	8.910937	8.917275	8.923563	8.929802	8.935992	8.942134	8.948229	8.954278	20
41	15 898216	904655	911043	917380	923668	929905	936095	942236	948330	954378	19
42	30 898324	904762	911149	917486	923772	930009	936198	942338	948432	954479	18
43	45 898431	904869	911255	917591	923876	930112	936300	942440	948533	954579	17
	41'	56'	11'	26'	41'	56'	11'	26'	41'	56'	
44	0 8.898539	8.904976	8.911361	8.917696	8.923981	8.930216	8.936403	8.942542	8.948634	8.954679	16
45	15 898647	905083	911467	917801	924085	930320	936506	942644	948735	954780	15
46	30 898754	905190	911573	917906	924189	930423	936608	942746	948836	954880	14
47	45 898862	905296	911679	918011	924294	930527	936711	942848	948937	954980	13
	42'	57'	12'	27'	42'	57'	12'	27'	42'	57'	
48	0 8.898970	8.905403	8.911785	8.918116	8.924398	8.930630	8.936814	8.942950	8.949038	8.955081	12
49	15 899077	905510	911891	918222	924502	930733	936916	943052	949139	955181	11
50	30 899185	905617	911997	918327	924606	930837	937019	943153	949241	955281	10
51	45 899293	905723	912103	918432	924711	930940	937122	943255	949342	955381	9
	43'	58'	13'	28'	43'	58'	13'	28'	43'	58'	
52	0 8.899400	8.905830	8.912209	8.918537	8.924815	8.931044	8.937224	8.943357	8.949443	8.955482	8
53	15 899508	905937	912315	918642	924919	931147	937327	943459	949544	955582	7
54	30 899615	906044	912421	918747	925023	931251	937430	943561	949645	955682	6
55	45 899723	906150	912526	918852	925127	931354	937532	943662	949746	955783	5
	44'	59'	14'	29'	44'	59'	14'	29'	44'	59'	
56	0 8.899831	8.906257	8.912632	8.918957	8.925232	8.931457	8.937635	8.943764	8.949847	8.955863	4
57	15 899938	906364	912738	919062	925336	931561	937737	943866	949948	955983	3
58	30 900046	906470	912844	919167	925440	931664	937840	943968	950049	956083	2
59	45 900153	906577	912950	919272	925544	931767	937942	944069	950150	956183	1
60	60 8.900261	8.906684	8.913055	8.919377	8.925648	8.931871	8.938045	8.944171	8.950251	8 956284	0
sec.	49m	48m	47m	46m	45m	44m	43m	42m	41m	40m	sec.

2 Hours.	Log. Haversines.	2 Hours.

	20m	21m	22m	23m	24m	25m	26m	27m	28m	29m	
	35 deg.				36 deg.				37 deg.		
sec.	′ 0′	15′	30′	45′	0′	15′	30′	45′	0′	15′	sec.
0	0 8.956284	8.962271	8.968213	8.974111	8.979965	8.985775	8.991543	8.997269	9.002953	9.008596	60
1	15 956384	962370	968312	974209	980062	985872	991639	997364	003047	008690	59
2	30 956484	962470	968410	974307	980159	985968	991735	997459	003142	008783	58
3	45 956584	962569	968509	974405	980256	986065	991830	997554	003236	008877	57
	1′	16′	31′	46′	1′	16′	31′	46′	1′	16′	
4	0 8.956684	8.962668	8.968608	8.974502	8.980353	8.986161	8.991926	8.997649	9.003330	9.008971	56
5	15 956784	962768	968706	974600	980451	986258	992022	997744	003425	009064	55
6	30 956884	962867	968805	974698	980548	986354	992118	997839	003519	009158	54
7	45 956984	962966	968903	974796	980645	986450	992213	997934	003613	009252	53
	2′	17′	33′	47′	2′	17′	33′	47′	2′	17′	
8	0 8.957085	8.963066	8.969002	8.974894	8.980742	8.986547	8.992309	8.998029	9.003708	9.009345	52
9	15 957185	963165	969101	974992	980839	986643	992405	998124	003802	009439	51
10	30 957285	963264	969199	975090	980936	986740	992500	998219	003896	009532	50
11	45 957385	963364	969298	975187	981033	986836	992596	998314	003990	009626	49
	3′	18′	33′	48′	3′	18′	33′	48′	3′	18′	
12	0 8.957485	8.963463	8.969396	8.975285	8.981130	8.986932	8.992692	8.998409	9.004085	9.009720	48
13	15 957585	963562	969495	975383	981227	987029	992787	998504	004179	009813	47
14	30 957685	963661	969593	975481	981324	987125	992883	998599	004273	009907	46
15	45 957785	963761	969692	975578	981421	987221	992978	998694	001367	010000	45
	4′	19′	34′	49′	4′	19′	34′	49′	4′	19′	
16	0 8.957885	8.963860	8.969790	8.975676	8.981518	8.987318	8.993074	8.998789	9.004462	9.010094	44
17	15 957985	963959	969889	975774	981615	987414	993170	998883	004556	010187	43
18	30 958085	964058	969987	975872	981712	987510	993265	998978	004650	010281	42
19	45 958184	964157	970086	975969	981809	987606	993361	999073	004744	010374	41
	5′	20′	35′	50′	5′	20′	35′	50′	5′	20′	
20	0 8.958284	8.964257	8.970184	8.976067	8.981906	8.987703	8.993456	8.999168	9.004838	9.010468	40
21	15 958384	964356	970282	976165	982003	987799	993552	999263	004933	010561	39
22	30 958484	964455	970381	976262	982100	987895	993647	999358	005027	010655	38
23	45 958584	964554	970479	976360	982197	987991	993743	999453	005121	010748	37
	6′	21′	36′	51′	6′	21′	36′	51′	6′	21′	
24	0 8.958684	8.964653	8.970578	8.976458	8.982294	8.988088	8.993838	8.999547	9.005215	9.010842	36
25	15 958784	964752	970676	976555	982391	988184	993934	999642	005309	010935	35
26	30 958884	964851	970774	976653	982488	988280	994029	999737	005403	011029	34
27	45 958983	964950	970873	976750	982585	988376	994125	999832	005497	011122	33
	7′	22′	37′	52′	7′	22′	37′	52′	7′	22′	
28	0 8.959083	8.965050	8.970971	8.976848	8.982682	8.988472	8.994220	8.999927	9.005591	9.011215	32
29	15 959183	965149	971069	976946	982778	988568	994316	9.000021	005685	011309	31
30	30 959283	965248	971168	977043	982875	988665	994411	000116	005779	011402	30
31	45 959383	965347	971266	977141	982972	988761	994507	000211	005873	011496	29
	8′	23′	38′	53′	8′	23′	38′	53′	8′	23′	
32	0 8.959482	8.965446	8.971364	8.977238	8.983069	8.988857	8.994602	9.000305	9.005968	9.011589	28
33	15 959582	965545	971462	977336	983166	988953	994697	000400	006062	011682	27
34	30 959682	965644	971561	977433	983263	989049	994793	000495	006156	011776	26
35	45 959782	965743	971659	977531	983359	989145	994888	000589	006250	011869	25
	9	24′	39′	54′	9′	24′	39′	54′	9′	24′	
36	0 8.959881	8.965842	8.971757	8.977628	8.983456	8.989241	8.994984	9.000684	9.006344	9.011962	24
37	15 959981	965941	971855	977726	983553	989337	995079	000779	006438	012055	23
38	30 960081	966040	971953	977823	983650	989433	995174	000874	006532	012149	22
39	45 960180	966138	972052	977921	983746	989529	995270	000968	006625	012242	21
	10′	25′	40′	55′	10′	25′	40′	55′	10′	25′	
40	0 8.960280	8.966237	8.972150	8.978018	8.983843	8.989625	8.995365	9.001063	9.006719	9.012335	20
41	15 960380	966336	972248	978116	983940	989721	995460	001157	006813	012429	19
42	30 960479	966435	972346	978213	984037	989817	995555	001252	006907	012522	18
43	45 960579	966534	972444	978310	984133	989913	995651	001346	007001	012615	17
	11′	26′	41′	56′	11′	26′	41′	56′	11′	26′	
44	0 8.960679	8.966633	8.972542	8.978408	8.984230	8.990009	8.995746	9.001441	9.007095	9.012708	16
45	15 960778	966732	972641	978505	984327	990105	995841	001536	007189	012802	15
46	30 960878	966831	972739	978603	984423	990201	995937	001630	007283	012895	14
47	45 960977	966929	972837	978700	984520	990297	996032	001725	007377	012988	13
	12′	27′	42′	57′	12′	27′	42′	57′	12′	27′	
48	0 8.961077	8.967028	8.972935	8.978797	8.984617	8.990393	8.996127	9.001819	9.007471	9.013081	12
49	15 961177	967127	973033	978895	984713	990489	996222	001914	007564	013174	11
50	30 961276	967226	973131	978992	984810	990585	996317	002008	007658	013267	10
51	45 961376	967325	973229	979089	984906	990681	996413	002103	007752	013361	9
	13′	28′	43′	58′	13′	28′	43′	58′	13′	28′	
52	0 8.961475	8.967423	8.973327	8.979187	8.985003	8.990777	8.996508	9.002197	9.007846	9.013454	8
53	15 961575	967522	973425	979284	985100	990872	996603	002292	007940	013547	7
54	30 961674	967621	973523	979381	985196	990968	996698	002386	008033	013640	6
55	45 961774	967720	973621	979478	985293	991064	996793	002481	008127	013733	5
	14′	29′	44′	59′	14′	29′	44′	59′	14′	29′	
56	0 8.961873	8.967818	8.973719	8.979576	8.985389	8.991160	8.996888	9.002575	9.008221	9.013826	4
57	15 961973	967917	973817	979673	985486	991256	996983	002670	008315	013919	3
58	30 962072	968016	973915	979770	985582	991352	997079	002764	008408	014012	2
59	45 962171	968114	974013	979867	985679	991447	997174	002858	008502	014105	1
60	60 8.962271	8.968213	8.974111	8.979965	8.985775	8.991543	8.997269	9.002953	9.008596	9.014198	0
sec.	39m	38m	37m	36m	35m	34m	33m	32m	31m	30m	sec.

2 Hours.	Log. Haversines.									2 Hours.
	30m	31m	32m	33m	34m	35m	36m	37m	38m	39m
sec.	37 deg.		38 deg.				39 deg.			sec.
	″ 30′	45′	0′	15′	30′	45′	0′	15′	30′	45′	
0	0 9.014198	9.019761	9.025284	9.030768	9.036213	9.041621	9.046991	9.052323	9.057619	9.062879	60
1	15 014291	019853	025375	030859	036304	041710	047080	052412	057707	062967	59
2	30 014384	019946	025467	030950	036394	041800	047169	052500	057795	063054	58
3	45 014477	020038	025559	031041	036484	041890	047258	052589	057883	063141	57
	31′	46′	1′	16′	31′	46′	1′	16′	31′	46′	
4	0 9.014570	9.020130	9.025651	9.031132	9.036575	9.041980	9.047347	9.052677	9.057971	9.063229	56
5	15 014663	020223	025742	031223	036665	042070	047436	052766	058059	063316	55
6	30 014756	020315	025834	031314	036756	042159	047525	052855	058147	063403	54
7	45 014849	020407	025926	031405	036846	042249	047615	052943	058235	063491	53
	32′	47′	2′	17′	32′	47′	2′	17′	32′	47′	
8	0 9.014942	9.020500	9.026017	9.031496	9.036936	9.042339	9.047704	9.053032	9.058323	9.063578	52
9	15 015035	020592	026109	031587	037027	042429	047793	053120	058411	063665	51
10	30 015128	020684	026201	031678	037117	042518	047882	053208	058499	063752	50
11	45 015221	020776	026292	031769	037207	042608	047971	053297	058586	063840	49
	33′	48′	3′	18′	33′	48′	3′	18′	33′	48′	
12	0 9.015314	9.020869	9.026384	9.031860	9.037298	9.042698	9.048060	9.053385	9.058674	9.063927	48
13	15 015407	020961	026475	031951	037388	042787	048149	053474	058762	064014	47
14	30 015500	021053	026567	032042	037478	042877	048238	053562	058850	064101	46
15	45 015593	021145	026658	032133	037569	042967	048327	053651	058938	064189	45
	34′	49′	4′	19′	34′	49′	4′	19′	34′	49′	
16	0 9.015686	9.021237	9.026750	9.032224	9.037659	9.043056	9.048416	9.053739	9.059026	9.064276	44
17	15 015778	021330	026841	032315	037749	043146	048505	053827	059113	064363	43
18	30 015871	021422	026933	032405	037839	043236	048594	053916	059201	064450	42
19	45 015964	021514	027025	032496	037930	043325	048683	054004	059289	064537	41
	36′	50′	5′	20′	35′	50′	5′	20′	35′	50′	
20	0′ 016057	9.021606	9.027116	9.032587	9.038020	9.043415	9.048772	9.054093	9.059377	9.064625	40
21	15 016150	021698	027208	032678	038110	043504	048861	054181	059464	064712	39
22	30 016243	021791	027299	032769	038200	043594	048950	054269	059552	064799	38
23	45 016335	021883	027391	032860	038291	043683	049039	054358	059640	064886	37
	36′	51′	6′	21′	36′	51′	6′	21′	36′	51′	
24	0 9.016428	9.021975	9.027482	9.032951	9.038381	9.043773	9.049128	9.054446	9.059728	9.064973	36
25	15 016521	022067	027573	033041	038471	043863	049217	054534	059815	065060	35
26	30 016614	022159	027665	033132	038561	043952	049306	054623	059903	065147	34
27	45 016706	022251	027756	033223	038651	044042	049395	054711	059991	065234	33
	37′	52′	7′	22′	37′	52′	7′	22′	37′	52′	
28	0 9.016799	9.022343	9.027848	9.033314	9.038741	9.044131	9.049484	9.054799	9.060078	9.065322	32
29	15 016892	022435	027939	033404	038832	044221	049573	054888	060166	065409	31
30	30 016985	022527	028031	033 95	038922	044310	049661	054976	060254	065496	30
31	45 017077	022619	028122	033 6	039012	044400	049750	055064	060341	065583	29
	38′	53′	8′	23′	38′	53′	8′	23′	38′	53′	
32	0 9.017170	9.022711	9.028213	9.033677	9.039102	9.044489	9.049839	9.055152	9.060429	9.065670	28
33	15 017263	022803	028305	033767	039192	044579	049928	055241	060517	065757	27
34	30 017355	022895	028396	033858	039282	044668	050017	055329	060604	065844	26
35	45 017448	022987	028487	033949	039372	044758	050106	055417	060692	065931	25
	39′	54′	9′	24′	39′	54′	9′	24′	39′	54′	
36	0 9.017541	9.023079	9.028579	9.034040	9.039462	9.044847	9.050195	9.055505	9.060780	9.066018	24
37	15 017633	023171	028670	034130	039552	044936	050283	055593	060867	066105	23
38	30 017726	023263	028762	034221	039642	045026	050372	055682	060955	066192	22
39	45 017818	023355	028853	034312	039732	045115	050461	055770	061042	066279	21
	40′	55′	10′	25′	40′	55′	10′	25′	40′	55′	
40	0 9.017911	9.023447	9.028944	9.034402	9.039822	9.045205	9.050550	9.055858	9.061130	9.066366	20
41	15 018004	023539	029035	034493	039912	045294	050638	055946	061217	066453	19
42	30 018096	023631	029127	034584	040002	045383	050727	056034	061305	066540	18
43	45 018189	023723	029218	034674	040092	045473	050816	056122	061393	066627	17
	41′	56′	11′	26′	41′	56′	11	26′	41′	56′	
44	0 9.018281	9.023815	9.029309	9.034765	9.040182	9.045562	9.050905	9.056211	9.061480	9.066714	16
45	15 018374	023907	029400	034855	040272	045652	050993	056299	061568	066801	15
46	30 018467	023999	029492	034946	040362	045741	051082	056387	061655	066888	14
47	45 018559	024090	029583	035037	040452	045830	051171	056475	061743	066974	13
	42′	57	12′	27′	42′	57′	12′	27′	42′	57′	
48	0 9.018652	9.024182	9.029674	9.035127	9.040542	9.045920	9.051260	9.056563	9.061830	9.067061	12
49	15 018744	024274	029765	035218	040632	046009	051348	056651	061918	067148	11
50	30 018837	024366	029856	035308	040722	046098	051437	056739	062005	067235	10
51	45 018929	024458	029948	035399	040812	046187	051526	056827	062093	067322	9
	43′	58′	13′	28′	43′	58′	13′	28′	43′	58′	
52	0 9.019021	9.024550	9.030039	9.035489	9.040902	9.046277	9.051614	9.056915	9.062180	9.067409	8
53	15 019114	024641	030130	035580	040992	046366	051703	057003	062267	067496	7
54	30 019206	024733	030221	035670	041082	046455	051792	057091	062355	067583	6
55	45 019299	024825	030312	035761	041171	046544	051880	057179	062442	067669	5
	44′	59′	14′	29′	44′	59′	14′	29′	44′	59′	
56	0 9.019391	9.024917	9.030403	9.035851	9.041261	9.046634	9.051969	9.057267	9.062530	9.067756	4
57	15 019484	025009	030494	035942	041351	046723	052057	057355	062617	067843	3
58	30 019576	025100	030586	036032	041441	046812	052146	057443	062704	067930	2
59	45 019668	025192	030677	036123	041531	046901	052235	057531	062792	068017	1
60	60 9.019761	9.025284	9.030768	9.036213	9.041621	9.046991	9.052323	9.057619	9.062879	9.068103	0
sec.	29m	28m	27m	26m	25m	24m	23m	22m	21m	20m	sec.

2 Hours. Log. Haversines. 2 Hours.

sec.	40m	41m	42m	43m	44m	45m	46m	47m	48m	49m	sec.
	40 deg.				41 deg.				42 deg.		
	0′	15′	30′	45′	0′	15′	30′	45′	0′	15′	
0	0 9.068103	9.073292	9.078446	9.083565	9.088651	9.093702	9.098720	9.103706	9.108658	9.113579	60
1	15 068190	073378	078532	083650	088735	093786	098804	103788	108741	113661	59
2	30 068277	073465	078617	083735	088820	093870	098887	103871	108823	113742	58
3	45 068364	073551	078703	083820	088904	093954	098970	103954	108905	113824	57
	1′	16′	31′	46′	1′	16′	31′	46′	1′	16′	
4	0 9.068450	9.073637	9.078788	9.083905	9.088988	9.094038	9.099054	9.104037	9.108987	9.113906	56
5	15 068537	073723	078874	083990	089073	094122	099137	104119	109070	113987	55
6	30 068624	073809	078959	084075	089157	094205	099220	104202	109152	114069	54
7	45 068711	073895	079045	084160	089242	094289	099304	104285	109234	114151	53
	2′	17′	32′	47′	2′	17′	32′	47′	2′	17′	
8	0 9.068797	9.073981	9.079131	9.084245	9.089326	9.094373	9.099387	9.104368	9.109316	9.114233	52
9	15 068884	074067	079216	084330	089410	094457	099470	104450	109398	114314	51
10	30 068971	074154	079302	084415	089495	094541	099553	104533	109481	114396	50
11	45 069057	074240	079387	084500	089579	094625	099637	104616	109563	114477	49
	3′	18′	33′	48′	3′	18′	33′	48′	3′	18′	
12	0 9.069144	9.074326	9.079473	9.084585	9.089664	9.094708	9.099720	9.104699	9.109645	9.114559	48
13	15 069231	074412	079558	084670	089748	094792	099803	104781	109727	114641	47
14	30 069317	074498	079644	084755	089832	094876	099886	104864	109809	114722	46
15	45 069404	074584	079729	084840	089917	094960	099970	104947	109891	114804	45
	4′	19′	34′	49′	4′	19′	34′	49′	4′	19′	
16	0 9.069490	9.074670	9.079815	9.084925	9.090001	9.095044	9.100053	9.105030	9.109974	9.114886	44
17	15 069577	074756	079900	085010	090085	095127	100136	105112	110056	114967	43
18	30 069664	074842	079985	085094	090170	095211	100219	105195	110138	115049	42
19	45 069750	074928	080071	085179	090254	095295	100302	105277	110220	115130	41
	5′	20′	35′	50′	5′	20′	35′	50′	5′	20′	
20	0 9.069837	9.075014	9.080156	9.085264	9.090338	9.095379	9.100386	9.105360	9.110302	9.115212	40
21	15 069923	075100	080242	085349	090422	095462	100469	105443	110384	115293	39
22	30 070010	075186	080327	085434	090507	095546	100552	105525	110466	115375	38
23	45 070097	075272	080412	085519	090591	095630	100635	105608	110548	115457	37
	6′	21′	36′	51′	6′	21′	36′	51′	6′	21′	
24	0 9.070183	9.075358	9.080498	9.085604	9.090675	9.095713	9.100718	9.105690	9.110630	9.115538	36
25	15 070270	075444	080583	085688	090759	095797	100801	105773	110712	115620	35
26	30 070356	075530	080669	085773	090844	095881	100885	105856	110794	115701	34
27	45 070443	075616	080754	085858	090928	095964	100968	105938	110876	115783	33
	7′	22′	37′	52′	7′	22′	37′	52′	7′	22′	
28	0 9.070529	9.075702	9.080839	9.085943	9.091012	9.096048	9.101051	9.106021	9.110959	9.115864	32
29	15 070616	075787	080925	086027	091096	096132	101134	106104	111041	115946	31
30	30 070702	075873	081010	086112	091181	096215	101217	106186	111123	116027	30
31	45 070789	075959	081095	086197	091265	096299	101300	106268	111205	116109	29
	8′	23′	38′	53′	8′	23′	38′	53′	8′	23′	
32	0 9.070875	9.076045	9.081181	9.086282	9.091349	9.096383	9.101383	9.106351	9.111287	9.116190	28
33	15 070962	076131	081266	086366	091433	096466	101466	106434	111369	116272	27
34	30 071048	076217	081351	086451	091517	096550	101549	106516	111451	116353	26
35	45 071134	076303	081436	086536	091601	096633	101632	106599	111532	116434	25
	9′	24′	39′	54′	9′	24′	39′	54′	9′	24′	
36	0 9.071221	9.076389	9.081522	9.086621	9.091686	9.096717	9.101715	9.106681	9.111614	9.116516	24
37	15 071307	076474	081607	086705	091770	096801	101798	106764	111696	116597	23
38	30 071394	076560	081692	086790	091854	096884	101881	106846	111778	116679	22
39	45 071480	076646	081777	086875	091938	096968	101964	106928	111860	116760	21
	10′	25′	40′	55′	10′	25′	40′	55′	10′	25	
40	0 9.071566	9.076732	9.081863	9.086959	9.092022	9.097051	9.102047	9.107011	9.111942	9.116841	20
41	15 071653	076818	081948	087044	092106	097135	102130	107093	112024	116923	19
42	30 071739	076903	082033	087129	092190	097218	102213	107176	112106	117004	18
43	45 071826	076989	082118	087213	092274	097302	102296	107258	112188	117086	17
	11′	26′	41′	56′	11′	26′	41′	56′	11′	26′	
44	0 9.071912	9.077075	9.082204	9.087298	9.092358	9.097385	9.102379	9.107341	9.112270	9.117167	16
45	15 071998	077161	082289	087382	092442	097469	102462	107423	112352	117248	15
46	30 072085	077247	082374	087467	092526	097552	102545	107506	112434	117330	14
47	45 072171	077332	082459	087552	092610	097636	102628	107588	112515	117411	13
	12′	27′	42′	57′	12′	27′	42′	57′	12′	27′	
48	0 9.072257	9.077418	9.082544	9.087636	9.092694	9.097719	9.102711	9.107670	9.112597	9.117492	12
49	15 072343	077504	082629	087721	092779	097803	102794	107753	112679	117574	11
50	30 072430	077589	082715	087805	092863	097886	102877	107835	112761	117655	10
51	45 072516	077675	082800	087890	092947	097970	102960	107917	112843	117736	9
	13′	28′	43′	58′	13′	28′	43′	58′	13′	28′	
52	0 9.072602	9.077761	9.082885	9.087975	9.093031	9.098053	9.103043	9.108000	9.112925	9.117818	8
53	15 072689	077846	082970	088059	093114	098137	103126	108082	113006	117899	7
54	30 072775	077932	083055	088144	093198	098220	103209	108165	113088	117980	6
55	45 072861	078018	083140	088228	093282	098303	103291	108247	113170	118061	5
	14′	29′	44′	59′	14′	29′	44′	59′	14′	29′	
56	0 9.072947	9.078103	9.083225	9.088313	9.093366	9.098387	9.103374	9.108329	9.113252	9.118143	4
57	15 073033	078189	083310	088397	093450	098470	103457	108411	113334	118224	3
58	30 073120	078275	083395	088482	093534	098554	103540	108494	113415	118305	2
59	45 073206	078360	083480	088566	093618	098637	103623	108576	113497	118386	1
60	60 9.073292	9 078446	9.083565	9.088651	9.093702	9.098720	9.103706	9.108658	9.113579	9.118468	0
sec.	19m	18m	17m	16m	15m	14m	13m	12m	11m	10m	sec.

21 Hours. 21 Hours.

2 Hours.	Log. Haversines.										2 Hours.
	50m	51m	52m	53m	54m	55m	56m	57m	58m	59m	
sec.	42 deg.		43 deg.				44 deg.				sec.
0	0	30'	45'	0'	15'	30'	45'	0'	15'	30'	45'	60
	0	9.118468	9.123325	9.128151	9.132946	9.137711	9.142446	9.147151	9.151826	9.156473	9.161090	
1	15	118549	123405	128231	133026	137790	142524	147229	151904	156550	161167	59
2	30	118630	123486	128311	133106	137869	142603	147307	151982	156627	161244	58
3	45	118711	123567	128391	133185	137948	142682	147385	152059	156704	161320	57
		31'	46'	1'	16'	31'	46'	1'	16'	31'	46'	
4	0	9.118792	9.123647	9.128472	9.133265	9.138028	9.142760	9.147463	9.152137	9.156781	9.161397	56
5	15	118873	123728	128552	133344	138107	142839	147542	152215	156859	161474	55
6	30	118955	123809	128632	133424	138186	142918	147620	152292	156936	161550	54
7	45	119036	123889	128712	133504	138265	142996	147698	152370	157013	161627	53
		32'	47'	2'	17'	32'	47'	2'	17'	32'	47'	
8	0	9.119117	9.123970	9.128792	9.133583	9.138344	9.143075	9.147776	9.152448	9.157090	9.161704	52
9	15	119198	124051	128872	133663	138423	143153	147854	152525	157167	161780	51
10	30	119279	124131	128952	133742	138502	143232	147932	152603	157244	161857	50
11	45	119360	124212	129032	133822	138581	143311	148010	152680	157321	161934	49
		33'	48'	3'	18'	33'	48'	3'	18'	33'	48'	
12	0	9.119441	9.124292	9.129112	9.133902	9.138660	9.143389	9.148088	9.152758	9.157399	9.162010	48
13	15	119523	124373	129192	133981	138739	143468	148166	152836	157476	162087	47
14	30	119604	124454	129273	134061	138819	143546	148244	152913	157553	162164	46
15	45	119685	124534	129353	134140	138898	143625	148322	152991	157630	162240	45
		34'	49'	4'	19'	34'	49'	4'	19'	34'	49'	
16	0	9.119766	9.124615	9.129433	9.134220	9.138977	9.143703	9.148401	9.153068	9.157707	9.162317	44
17	15	119847	124695	129513	134299	139056	143782	148479	153146	157784	162393	43
18	30	119928	124776	129593	134379	139135	143860	148557	153223	157861	162470	42
19	45	120009	124856	129673	134458	139214	143939	148635	153301	157938	162546	41
		35'	50'	5'	20'	35'	50'	5'	20'	35'	50'	
20	0	9.120090	9.124937	9.129753	9.134538	9.139293	9.144017	9.148713	9.153378	9.158015	9.162623	40
21	15	120171	125017	129833	134617	139372	144096	148791	153456	158092	162700	39
22	30	120252	125098	129913	134697	139451	144174	148869	153533	158169	162776	38
23	45	120333	125178	129993	134776	139530	144253	148947	153611	158246	162853	37
		36'	51'	6'	21'	36'	51'	6'	21'	36'	51'	
24	0	9.120414	9.125259	9.130073	9.134856	9.139609	9.144331	9.149025	9.153688	9.158323	9.162929	36
25	15	120495	125339	130153	134935	139687	144410	149103	153766	158400	163006	35
26	30	120576	125420	130233	135015	139766	144488	149180	153843	158477	163082	34
27	45	120657	125500	130312	135094	139845	144567	149258	153921	158554	163159	33
		37'	52'	7'	22'	37'	52'	7'	22'	37'	52'	
28	0	9.120738	9.125581	9.130392	9.135174	9.139924	9.144645	9.149336	9.153998	9.158631	9.163235	32
29	15	120819	125661	130472	135253	140003	144724	149414	154076	158708	163312	31
30	30	120900	125742	130552	135332	140082	144802	149492	154153	158785	163388	30
31	45	120981	125822	130632	135412	140161	144880	149570	154231	158862	163465	29
		38'	53'	8'	23'	38'	53'	8'	23'	38'	53'	
32	0	9.121062	9.125903	9.130712	9.135491	9.140240	9.144959	9.149648	9.154308	9.158939	9.163541	28
33	15	121143	125983	130792	135571	140319	145037	149726	154385	159016	163618	27
34	30	121224	126063	130872	135650	140398	145116	149804	154463	159093	163694	26
35	45	121305	126144	130952	135729	140477	145194	149882	154540	159170	163771	25
		39'	54'	9'	24'	39'	54'	9'	24'	39'	54	
36	0	9.121386	9.126224	9.131032	9.135809	9.140556	9.145272	9.149960	9.154618	9.159247	9.163847	24
37	15	121467	126304	131112	135888	140634	145351	150038	154695	159324	163923	23
38	30	121547	126385	131191	135967	140713	145429	150115	154772	159401	164000	22
39	45	121628	126465	131271	136047	140792	145507	150193	154850	159477	164076	21
		40'	55'	10'	25'	40'	55'	10'	25'	40'	55'	
40	0	9.121709	9.126546	9.131351	9.136126	9.140871	9.145586	9.150271	9.154927	9.159554	9.164153	20
41	15	121790	126626	131431	136205	140950	145664	150349	155004	159631	164229	19
42	30	121871	126706	131511	136285	141029	145742	150427	155082	159708	164306	18
43	45	121952	126787	131591	136364	141107	145821	150505	155159	159785	164382	17
		41'	56'	11'	26'	41'	56'	11'	26'	41'	56'	
44	0	9.122033	9.126867	9.131670	9.136443	9.141186	9.145899	9.150582	9.155237	9.159862	9.164458	16
45	15	122113	126947	131750	136522	141265	145977	150660	155314	159939	164535	15
46	30	122194	127028	131830	136602	141344	146056	150738	155391	160015	164611	14
47	45	122275	127108	131910	136681	141422	146134	150816	155468	160092	164687	13
		42'	57'	12'	27'	42'	57'	12'	27'	42'	57'	
48	0	9.122356	9.127188	9.131990	9.136761	9.141501	9.146212	9.150894	9.155546	9.160169	9.164764	12
49	15	122437	127268	132069	136840	141580	146290	150971	155623	160246	164840	11
50	30	122517	127349	132149	136919	141659	146369	151049	155700	160323	164916	10
51	45	122598	127429	132229	136998	141737	146447	151127	155778	160399	164993	9
		43'	58'	13'	28'	43'	58'	13'	28'	43'	58'	
52	0	9.122679	9.127509	9.132309	9.137077	9.141816	9.146525	9.151205	9.155855	9.160476	9.165069	8
53	15	122760	127589	132388	137157	141895	146603	151282	155932	160554	165145	7
54	30	122840	127670	132468	137236	141974	146682	151360	156009	160630	165222	6
55	15	122921	127750	132548	137315	142052	146760	151438	156087	160707	165298	5
		44'	59'	14'	29'	44'	59'	14'	29'	44'	59'	
56	0	9.123002	9.127830	9.132627	9.137394	9.142131	9.146838	9.151516	9.156164	9.160783	9.165374	4
57	15	123083	127910	132707	137473	142210	146916	151593	156241	160860	165450	3
58	30	123163	127990	132787	137553	142288	146994	151671	156318	160937	165527	2
59	45	123244	128071	132866	137632	142367	147073	151749	156395	161013	165603	1
60	60	9.123325	9.128151	9.132946	9.137711	9.142446	9.147151	9.151826	9.156473	9.161090	9.165679	0
sec.		9m	8m	7m	6m	5m	4m	3m	2m	1m	0m	sec.

3 Hours.	Log. Haversines.								3 Hours.	
	0m	1m	2m	3m	4m	5m	6m	7m	8m	9m
sec.	45 deg.				46 deg.				47 deg.	
	0'	15'	30'	45'	0'	15'	30'	45'	0'	15'
0	0 9.165679	9.170240	9.174773	9.179278	9.183756	9.188207	9.192631	9.197028	9.201399	9.205745 60
1	15 165755	170316	174848	179353	183830	188281	192704	197101	201472	205817 59
2	30 165832	170392	174924	179428	183905	188355	192778	197174	201545	205889 58
3	45 165908	170467	174999	179503	183979	188429	192851	197247	201617	205961 57
	1'	16'	31'	46'	1'	16'	31'	46'	1'	16'
4	0 9.165984	9.170543	9.175074	9.179578	9.184054	9.188503	9.192925	9.197320	9.201690	9.206033 56
5	15 166060	170619	175149	179652	184128	188576	192998	197393	201762	206105 55
6	30 166137	170695	175225	179727	184202	188650	193072	197466	201835	206178 54
7	45 166213	170770	175300	179802	184277	188724	193145	197539	201908	206250 53
	2'	17'	32'	47'	2'	17'	32'	47'	2'	17'
8	0 9.166289	9.170846	9.175375	9.179877	9.184351	9.188798	9 193219	9.197613	9.201980	9.206322 52
9	15 166365	170922	175450	179952	184425	188872	193292	197685	202053	206394 51
10	30 166441	170998	175526	180026	184500	188946	193366	197759	202125	206466 50
11	45 166517	171073	175601	180101	184574	189020	193439	197831	202198	206538 49
	3'	18'	33'	48'	3'	18'	33'	48'	3'	18'
12	0 9.166594	9.171149	9.175676	9.180176	9.184648	9.189094	9.193512	9.197905	9.202270	9.206610 48
13	15 166670	171225	175751	180251	184723	189168	193586	197977	202343	206683 47
14	30 166746	171300	175827	180325	184797	189241	193659	198050	202416	206755 46
15	45 166822	171376	175902	180400	184871	189315	193733	198123	202488	206827 45
	4'	19'	34'	49'	4'	19'	34'	49'	4'	19'
16	0 9.166898	9.171452	9.175977	9.180475	9.184946	9.189389	9.193806	9.198196	9.202561	9.206899 44
17	15 166974	171527	176052	180550	185020	189463	193879	198269	202633	206971 43
18	30 167051	171603	176127	180624	185094	189537	193953	198342	202706	207043 42
19	45 167127	171678	176203	180699	185168	189611	194026	198415	202778	207115 41
	5'	20'	35'	50'	5'	20'	35'	50'	5'	20'
20	0 9.167203	9.171754	9.176278	9.180774	9.185243	9.189684	9.194100	9.198488	9.202851	9.207187 40
21	15 167279	171830	176353	180848	185317	189758	194173	198561	202923	207259 39
22	30 167355	171905	176428	180923	185391	189832	194246	198634	202996	207331 38
23	45 167431	171981	176503	180998	185465	189906	194319	198707	203068	207403 37
	6'	21'	36'	51'	6'	21'	36'	51'	6'	21'
24	0 9.167507	9.172057	9.176578	9.181073	9.185540	9.189980	9.194393	9.198780	9.203141	9.207475 36
25	15 167583	172132	176653	181147	185614	190053	194466	198853	203213	207547 35
26	30 167659	172208	176729	181222	185688	190127	194540	198926	203285	207619 34
27	45 167735	172283	176804	181297	185762	190201	194613	198998	203358	207691 33
	7'	22'	37'	52'	7'	22'	37'	52'	7'	22'
28	0 9.167811	9.172359	9.176879	9.181371	9.185836	9.190275	9.194686	9.199071	9.203430	9.207763 32
29	15 167887	172434	176954	181446	185911	190348	194759	199144	203503	207835 31
30	30 167963	172510	177029	181521	185985	190422	194833	199217	203575	207907 30
31	45 168039	172586	177104	181595	186059	190496	194906	199290	203648	207979 29
	8'	23'	38'	53'	8'	23'	38'	53'	8'	23'
32	0 9.168115	9.172661	9.177179	9.181670	9.186133	9.190570	9.194979	9.199363	9.203720	9.208051 28
33	15 168191	172737	177254	181744	186207	190643	195053	199436	203792	208123 27
34	30 168267	172812	177329	181819	186281	190717	195126	199508	203865	208195 26
35	45 168343	172888	177404	181894	186356	190791	195199	199581	203937	208267 25
	9'	24'	39'	54'	9'	24'	39'	54'	9'	24'
36	0 9.168419	9.172963	9.177479	9.181968	9.186430	9.190864	9.195272	9.199654	9.204010	9.208339 24
37	15 168495	173039	177554	182043	186504	190938	195346	199727	204082	208411 23
38	30 168571	173114	177629	182117	186578	191012	195419	199800	204154	208483 22
39	45 168647	173190	177704	182192	186652	191085	195492	199872	204227	208555 21
	10'	25'	40'	55'	10'	25'	40'	55'	10'	25'
40	0 9.168723	9.173265	9.177779	9.182266	9.186726	9.191159	9.195565	9.199945	9.204299	9.208627 20
41	15 168799	173341	177854	182341	186800	191233	195638	200018	204371	208699 19
42	30 168875	173416	177929	182416	186874	191306	195712	200091	204444	208771 18
43	45 168951	173491	178004	182490	186948	191380	195785	200163	204516	208843 17
	11'	26'	41'	56'	11'	26'	41'	56'	11'	26'
44	0 9.169027	9.173567	9.178079	9.182565	9.187023	9.191454	9.195858	9.200236	9.204588	9.208915 16
45	15 169102	173642	178154	182639	187097	191527	195931	200309	204661	208986 15
46	30 169178	173718	178229	182714	187171	191601	196004	200382	204733	209058 14
47	45 169254	173793	178304	182788	187245	191674	196078	200454	204805	209130 13
	12'	27'	42'	57'	12'	27'	42'	57'	12'	27'
48	0 9.169330	9.173869	9.178379	9.182863	9.187319	9.191748	9.196151	9.200527	9.204878	9.209202 12
49	15 169406	173944	178454	182937	187393	191822	196224	200600	204950	209274 11
50	30 169482	174019	178529	183012	187467	191895	196297	200673	205022	209346 10
51	45 169558	174095	178604	183086	187541	191969	196370	200745	205094	209418 9
	13'	28'	43'	58'	13'	28'	43'	58'	13'	28'
52	0 9.169634	9.174170	9.178679	9.183161	9.187615	9.192042	9.196443	9.200818	9.205167	9.209490 8
53	15 169709	174246	178754	183235	187689	192116	196516	200891	205239	209561 7
54	30 169785	174321	178829	183309	187763	192190	196590	200963	205311	209633 6
55	45 169861	174396	178904	183384	187837	192263	196663	201036	205383	209705 5
	14'	29'	44'	59'	14'	27'	14'	59'	14'	29'
56	0 9.169937	9.174472	9.178979	9.183458	9.187911	9.192337	9.196736	9.201109	9.205456	9.209777 4
57	15 170013	174547	179054	183533	187985	192410	196809	201181	205528	209849 3
58	30 170089	174622	179128	183607	188059	192484	196882	201254	205600	209920 2
59	45 170164	174698	179203	183682	188133	192557	196955	201327	205672	209992 1
60	60 9.170240	9.174773	9.179278	9.183756	9.188207	9.192631	9.197028	9.201399	9.205745	9.210064 0
sec.	59m	58m	57m	56m	55m	54m	53m	52m	51m	50m sec.

3 Hours.	Log. Haversines.	3 Hours.

	10m	11m	12m	13m	14m	15m	16m	17m	18m	19m	
	47 deg.		48 deg.				49 deg.				
sec.	′	30′ 45′	0′	15′	30′	45′	0′	15′	30′	45′	sec.
0	0	9.210064 9.214358	9.218627	9.222870	9.227089	9.231284	9.235454	9.239600	9.243722	9.247821	60
1	15	210136 214429	218697	222941	227159	231353	235523	239669	243791	247889	59
2	30	210207 214501	218768	223011	227229	231423	235593	239738	243859	247957	58
3	45	210279 214572	218839	223082	227300	231493	235662	239807	243928	248025	57
		31′ 46′	1′	16′	31′	46′	1′	16′	31′	46′	
4	0	9.210351 9.214643	9.218910	9.223152	9.227370	9.231562	9.235731	9.239876	9.243996	9.248094	56
5	15	210423 214715	218981	223223	227440	231632	235800	239944	244065	248162	55
6	30	210494 214786	219052	223293	227510	231702	235870	240013	244133	248230	54
7	45	210566 214857	219123	223364	227580	231771	235939	240082	244204	248298	53
		32′ 47′	2′	17′	32′	47′	2′	17′	32′	47′	
8	0	9.210638 9.214929	9.219194	9.223434	9.227650	9.231841	9.236008	9.240151	9.244270	9.248366	52
9	15	210710 215000	219265	223505	227720	231911	236077	240220	244339	248434	51
10	30	210781 215071	219336	223575	227790	231980	236147	240289	244407	248502	50
11	45	210853 215142	219406	223646	227860	232050	236216	240358	244476	248570	49
		33′ 48′	3′	18′	33′	48′	3′	18′	33′	48′	
12	0	9.210925 9.215214	9.219477	9.223716	9.227930	9.232120	9.236285	9.240426	9.244544	9.248638	48
13	15	210996 215285	219548	223786	228000	232189	236354	240495	244612	248706	47
14	30	211068 215356	219619	223857	228070	232259	236423	240564	244681	248774	46
15	45	211140 215427	219690	223927	228140	232329	236493	240633	244749	248842	45
		34′ 49′	4′	19′	34′	49′	4′	19′	34′	49′	
16	0	9.211211 9.215499	9.219761	9.223998	9.228210	9.232398	9.236562	9.240702	9.244818	9.248910	44
17	15	211283 215570	219831	224068	228280	232468	236631	240770	244886	248978	43
18	30	211355 215641	219902	224139	228350	232537	236700	240839	244954	249046	42
19	45	211426 215712	219973	224209	228420	232607	236769	240908	245023	249114	41
		35′ 50′	5′	20′	35′	50′	5′	20′	35′	50′	
20	0	9.211498 9.215784	9.220044	9.224279	9.228490	9.232676	9.236839	9.240977	9.245091	9.249182	40
21	15	211570 215855	220115	224350	228560	232746	236908	241046	245160	249250	39
22	30	211641 215926	220186	224420	228630	232816	236977	241114	245228	249318	38
23	45	211713 215997	220256	224490	228700	232885	237046	241183	245296	249386	37
		36′ 51′	6′	21′	36′	51′	6′	21′	36′	51′	
24	0	9.211785 9.216068	9.220327	9.224561	9.228770	9.232955	9.237115	9.241252	9.245365	9.249454	36
25	15	211856 216140	220398	224631	228840	233024	237184	241321	245433	249522	35
26	30	211928 216211	220469	224702	228910	233094	237254	241389	245501	249590	34
27	45	211999 216282	220539	224772	228980	233163	237323	241458	245570	249658	33
		37′ 52′	7′	22′	37′	52′	7′	22′	37′	52′	
28	0	9.212071 9.216353	9.220610	9.224842	9.229050	9.233233	9.237392	9.241527	9.245638	9.249726	32
29	15	212143 216424	220681	224912	229120	233302	237461	241595	245706	249794	31
30	30	212214 216495	220752	224983	229190	233372	237530	241664	245775	249862	30
31	45	212286 216566	220822	225053	229259	233441	237599	241733	245843	249930	29
		38′ 53′	8′	23′	38′	53′	8′	23′	38′	53′	
32	0	9.212357 9.216638	9.220893	9.225123	9.229329	9.233511	9.237668	9.241802	9.245911	9.249998	28
33	15	212429 216709	220964	225194	229399	233580	237737	241870	245980	250065	27
34	30	212500 216780	221034	225264	229469	233650	237806	241939	246048	250133	26
35	45	212572 216851	221105	225334	229539	233719	237875	242008	246116	250201	25
		39′ 54′	9′	24′	39′	54′	9′	24′	39′	54′	
36	0	9.212643 9.216922	9.221176	9.225405	9.229609	9.233789	9.237944	9.242076	9.246184	9.250269	24
37	15	212715 216993	221246	225475	229679	233858	238014	242145	246253	250337	23
38	30	212786 217064	221317	225545	229749	233928	238083	242214	246321	250405	22
39	45	212858 217135	221388	225615	229818	233997	238152	242282	246389	250473	21
		40′ 55′	10′	25′	40′	55′	10′	25′	40′	55′	
40	0	9.212929 9.217206	9.221459	9.225686	9.229888	9.234067	9.238221	9.242351	9.246457	9.250541	20
41	15	213001 217277	221529	225756	229958	234136	238290	242420	246526	250608	19
42	30	213072 217349	221600	225826	230028	234205	238359	242488	246594	250676	18
43	45	213144 217420	221670	225896	230098	234275	238428	242557	246662	250744	17
		41′ 56′	11′	26′	41′	56′	11′	26′	41′	56′	
44	0	9.213215 9.217491	9.221741	9.225967	9.230168	9.234344	9.238497	9.242625	9.246730	9.250812	16
45	15	213287 217562	221812	226037	230237	234414	238566	242694	246799	250880	15
46	30	213358 217633	221882	226107	230307	234483	238635	242763	246867	250948	14
47	45	213430 217704	221953	226177	230377	234552	238704	242831	246935	251015	13
		42′ 57′	12′	27′	42′	57′	12′	27′	42′	57′	
48	0	9.213501 9.217775	9.222024	9.226247	9.230447	9.234622	9.238773	9.242900	9.247003	9.251083	12
49	15	213573 217846	222094	226318	230517	234691	238842	242968	247071	251151	11
50	30	213644 217917	222165	226388	230586	234761	238911	243037	247140	251219	10
51	45	213715 217988	222235	226458	230656	234830	238980	243106	247208	251287	9
		43′ 58′	13′	28′	43′	58′	13′	28′	43′	58′	
52	0	9.213787 9.218059	9.222306	9.226528	9.230726	9.234899	9.239049	9.243174	9.247276	9.251354	8
53	15	213858 218130	222376	226598	230796	234969	239118	243243	247344	251422	7
54	30	213930 218201	222447	226668	230865	235038	239187	243311	247412	251490	6
55	45	214001 218272	222518	226739	230935	235107	239255	243380	247480	251558	5
		44′ 59′	14′	29′	44′	59′	14′	29′	44′	59′	
56	0	9.214072 9.218343	9.222588	9.226809	9.231005	9.235177	9.239324	9.243448	9.247549	9.251626	4
57	15	214144 218414	222659	226879	231075	235246	239393	243517	247617	251693	3
58	30	214215 218485	222729	226949	231144	235315	239462	243585	247685	251761	2
59	45	214286 218556	222800	227019	231214	235385	239531	243654	247753	251829	1
60	60	9.214358 9.218627	9.222870	9.227089	9.231284	9.235454	9.239600	9.243722	9.247821	9.251897	0
sec.		49m 48m	47m	46m	45m	44m	43m	42m	41m	40m	sec.

3 Hours. Log. Haversines. 3 Hours.

sec.	20m	21m	22m	23m	24m	25m	26m	27m	28m	29m	sec.
	50 deg.				51 deg.				52 deg.		
	0′	15′	30′	45′	0′	15′	30′	45′	0′	15′	
0	0 9.251897	9.255949	9.259978	9.263985	9.267969	9.271930	9.275870	9.279788	9.283684	9.287558	60
1	15 251964	256016	260045	264051	268035	271996	275936	279853	283749	287623	59
2	30 252032	256083	260112	264118	268101	272062	276001	279918	283813	287687	58
3	45 252100	256151	260179	264184	268167	272128	276066	279983	283878	287752	57
	1′	16′	31′	46′	1′	16′	31′	46′	1′	16′	
4	0 9.252167	9.256218	9.260246	9.264251	9.268234	9.272194	9.276132	9.280048	9.283943	9.287816	56
5	15 252235	256285	260313	264317	268300	272260	276197	280113	284008	287880	55
6	30 252303	256353	260380	264384	268366	272325	276263	280178	284072	287945	54
7	45 252370	256420	260447	264451	268432	272391	276328	280243	284137	288009	53
	2′	17′	32′	47′	2′	17′	32′	47′	2′	17′	
8	0 9.252438	9.256487	9.260514	9.264517	9.268498	9.272457	9.276394	9.280309	9.284202	9.288073	52
9	15 252506	256555	260580	264584	268564	272523	276459	280374	284266	288138	51
10	30 252573	256622	260647	264650	268631	272589	276525	280439	284331	288202	50
11	45 252641	256689	260714	264717	268697	272654	276590	280504	284396	288266	49
	3′	18′	33′	48′	3′	18′	33′	48′	3′	18′	
12	0 9.252709	9.256756	9.260781	9.264783	9.268763	9.272720	9.276655	9.280569	9.284461	9.288331	48
13	15 252776	256824	260848	264850	268829	272786	276721	280634	284525	288395	47
14	30 252844	256891	260915	264916	268895	272852	276786	280699	284590	288459	46
15	45 252912	256958	260982	264983	268961	272917	276852	280764	284654	288524	45
	4′	19′	34′	49′	4′	19′	34′	49′	4′	19′	
16	0 9.252979	9.257025	9.261049	9.265049	9.269027	9.272983	9.276917	9.280829	9.284719	9.288588	44
17	15 253047	257093	261115	265116	269093	273049	276982	280894	284784	288652	43
18	30 253115	257160	261182	265182	269160	273115	277048	280959	284849	288717	42
19	45 253182	257227	261249	265249	269226	273180	277113	281024	284913	288781	41
	5′	20′	35′	50′	5′	20′	35′	50′	5′	20′	
20	0 9.253250	9.257294	9.261316	9.265315	9.269292	9.273246	9.277178	9.281089	9.284978	9.288845	40
21	15 253317	257362	261383	265382	269358	273312	277244	281154	285042	288909	39
22	30 253385	257429	261450	265448	269424	273378	277309	281219	285107	288974	38
23	45 253453	257496	261517	265514	269490	273443	277374	281284	285172	289038	37
	6′	21′	36′	51′	6′	21′	36′	51′	6′	21′	
24	0 9.253520	9.257563	9.261583	9.265581	9.269556	9.273509	9.277440	9.281349	9.285236	9.289102	36
25	15 253588	257630	261650	265647	269622	273575	277505	281414	285301	289166	35
26	30 253655	257698	261717	265714	269688	273640	277570	281479	285366	289231	34
27	45 253723	257765	261784	265780	269754	273706	277636	281544	285430	289295	33
	7′	22′	37′	52′	7′	22′	37′	52′	7′	22′	
28	0 9.253790	9.257832	9.261851	9.265847	9.269820	9.273772	9.277701	9.281609	9.285495	9.289359	32
29	15 253858	257899	261917	265913	269886	273837	277766	281674	285559	289423	31
30	30 253926	257966	261984	265979	269952	273903	277832	281739	285624	289488	30
31	45 253993	258033	262051	266046	270018	273969	277897	281803	285688	289552	29
	8′	23′	38′	53′	8′	23′	38′	53′	8′	23′	
32	0 9.254061	9.258101	9.262118	9.266112	9.270084	9.274034	9.277962	9.281868	9.285753	9.289616	28
33	15 254128	258168	262184	266179	270150	274100	278028	281933	285817	289680	27
34	30 254196	258235	262251	266245	270216	274166	278093	281998	285882	289745	26
35	45 254263	258302	262318	266311	270282	274231	278158	282063	285947	289809	25
	9′	24′	39′	54′	9′	24′	39′	54′	9′	24′	
36	0 9.254331	9.258369	9.262385	9.266378	9.270348	9.274297	9.278223	9.282128	9.286011	9.289873	24
37	15 254398	258436	262451	266444	270414	274362	278289	282193	286076	289937	23
38	30 254466	258503	262518	266510	270480	274428	278354	282258	286140	290001	22
39	45 254533	258570	262585	266577	270546	274494	278419	282323	286205	290065	21
	10′	25′	40′	55′	10′	25′	40′	55′	10′	25′	
40	0 9.254601	9.258637	9.262652	9.266643	9.270612	9.274559	9.278484	9.282388	9.286269	9.290130	20
41	15 254666	258705	262718	266709	270678	274625	278550	282452	286334	290194	19
42	30 254735	258772	262785	266776	270744	274691	278615	282517	286398	290258	18
43	45 254803	258839	262852	266842	270810	274756	278680	282582	286463	290322	17
	11′	26′	41′	56′	11′	26′	41′	56′	11′	26′	
44	0 9.254870	9.258906	9.262918	9.266908	9.270876	9.274822	9.278745	9.282647	9.286527	9.290386	16
45	15 254938	258973	262985	266975	270942	274887	278810	282712	286592	290450	15
46	30 255005	259040	263052	267041	271008	274953	278876	282777	286656	290514	14
47	45 255073	259107	263118	267107	271074	275018	278941	282842	286721	290579	13
	12′	27′	42′	57′	12′	27′	42′	57′	12′	27′	
48	0 9.255140	9.259174	9.263185	9.267174	9.271140	9.275084	9.279006	9.282906	9.286785	9.290643	12
49	15 255207	259241	263252	267240	271206	275149	279071	282971	286850	290707	11
50	30 255275	259308	263318	267306	271272	275215	279136	283036	286914	290771	10
51	45 255342	259375	263385	267372	271338	275281	279202	283101	286979	290835	9
	13′	28′	43′	58′	13′	28′	43′	58′	13′	28′	
52	0 9.255419	9.259442	9.263452	9.267439	9.271404	9.275346	9.279267	9.283166	9.287043	9.290899	8
53	15 255477	259509	263518	267505	271469	275412	279332	283230	287107	290963	7
54	30 255545	259576	263585	267571	271535	275477	279397	283295	287172	291027	6
55	45 255612	259643	263652	267638	271601	275543	279462	283360	287236	291091	5
	14′	29′	44′	59′	14′	29′	44′	59′	14′	29′	
56	0 9.255679	9.259710	9.263718	9.267704	9.271667	9.275608	9.279527	9.283425	9.287301	9.291155	4
57	15 255747	259777	263785	267770	271733	275674	279592	283490	287365	291219	3
58	30 255814	259844	263851	267836	271799	275739	279658	283554	287430	291284	2
59	45 255881	259911	263918	267902	271865	275805	279723	283619	287494	291348	1
60	60 9.255949	9.259978	9.263985	9.267969	9.271930	9.275870	9.279788	9.283684	9.287558	9.291412	0
sec.	39m	38m	37m	36m	35m	34m	33m	32m	31m	30m	sec.

3 Hours. Log. Haversines. 3 Hours.

sec.	30m	31m	32m	33m	34m	35m	36m	37m	38m	39m	sec.
	52 deg.			53 deg.			54 deg.				
	30′	45′	0′	15′	30′	45′	0′	15′	30′	45′	
0	0 9.291412	9.295244	9.299055	9.302845	9.306615	9.310364	9.314094	9.317803	9.321492	9.325161	60
1	15 291476	295307	299118	302908	306678	310427	314155	317864	321553	325222	59
2	30 291540	295371	299182	302971	306740	310489	314217	317926	321614	325283	58
3	45 291604	295435	299245	303034	306803	310551	314279	317987	321676	325344	57
	31′	46′	1′	16′	31′	46′	1′	16′	31′	46′	
4	0 9.291668	9.295498	9.299308	9.303097	9.306866	9.310614	9.314341	9.318049	9.321737	9.325405	56
5	15 291732	295562	299372	303160	306928	310676	314403	318111	321798	325466	55
6	30 291796	295626	299435	303223	306991	310738	314465	318172	321860	325527	54
7	45 291860	295689	299498	303286	307053	310800	314527	318234	321921	325588	53
	32′	47′	2′	17′	32′	47′	2′	17′	32′	47′	
8	0 9.291924	9.295753	9.299561	9.303349	9.307116	9.310863	9.314589	9.318296	9.321982	9.325649	52
9	15 291988	295817	299625	303412	307179	310925	314651	318357	322043	325710	51
10	30 292052	295880	299688	303475	307241	310987	314713	318419	322105	325771	50
11	45 292116	295944	299751	303538	307304	311050	314775	318480	322166	325832	49
	33′	48′	3′	18′	33′	48′	3′	18′	33′	48′	
12	0 9.292180	9.296008	9.299815	9.303601	9.307367	9.311112	9.314837	9.318542	9.322227	9.325893	48
13	15 292244	296071	299878	303664	307429	311174	314899	318604	322288	325954	47
14	30 292308	296135	299941	303727	307492	311236	314961	318665	322350	326015	46
15	45 292372	296198	300004	303790	307554	311299	315023	318727	322411	326076	45
	34′	49′	4′	19′	34′	49′	4′	19′	34′	49′	
16	0 9.292436	9.296262	9.300068	9.303853	9.307617	9.311361	9.315085	9.318788	9.322472	9.326136	44
17	15 292499	296326	300131	303915	307679	311423	315146	318850	322533	326197	43
18	30 292564	296389	300194	303978	307742	311485	315208	318911	322595	326258	42
19	45 292627	296453	300257	304041	307804	311547	315270	318973	322656	326319	41
	35′	50′	5′	20′	35′	50′	5′	20′	35′	50′	
20	0 9.292691	9.296516	9.300321	9.304104	9.307867	9.311610	9.315332	9.319035	9.322717	9.326380	40
21	15 292755	296580	300384	304167	307930	311672	315394	319096	322778	326441	39
22	30 292819	296644	300447	304230	307992	311734	315456	319158	322840	326502	38
23	45 292884	296707	300510	304293	308055	311796	315518	319219	322901	326563	37
	36′	51′	6′	21′	36′	51′	6′	21′	36′	51′	
24	0 9.292947	9.296771	9.300574	9.304356	9.308117	9.311858	9.315580	9.319281	9.322962	9.326624	36
25	15 293011	296834	300637	304418	308180	311921	315641	319342	323023	326684	35
26	30 293075	296898	300700	304481	308242	311983	315703	319404	323084	326745	34
27	45 293139	296961	300763	304544	308305	312045	315765	319465	323145	326806	33
	37′	52′	7′	22′	37′	52′	7′	22′	37′	52′	
28	0 9.293203	9.297025	9.300826	9.304607	9.308367	9.312107	9.315827	9.319527	9.323207	9.326867	32
29	15 293266	297088	300889	304670	308430	312169	315889	319588	323268	326928	31
30	30 293330	297152	300953	304733	308492	312231	315951	319650	323329	326989	30
31	45 293394	297215	301016	304796	308555	312294	316012	319711	323390	327049	29
	38′	53′	8′	23′	38′	53′	8′	23′	38′	53′	
32	0 9.293458	9.297279	9.301079	9.304858	9.308617	9.312356	9.316074	9.319773	9.323451	9.327110	28
33	15 293522	297342	301142	304921	308680	312418	316136	319834	323512	327171	27
34	30 293586	297406	301205	304984	308742	312480	316198	319896	323574	327232	26
35	45 293650	297469	301268	305047	308805	312542	316260	319957	323635	327293	25
	39′	54′	9′	24′	39′	54′	9′	24′	39′	54′	
36	0 9.293713	9.297533	9.301332	9.305110	9.308867	9.312604	9.316321	9.320019	9.323696	9.327354	24
37	15 293777	297596	301395	305172	308929	312666	316383	320080	323757	327414	23
38	30 293841	297660	301458	305235	308992	312729	316445	320141	323818	327475	22
39	45 293905	297723	301521	305298	309054	312791	316507	320203	323879	327536	21
	40′	55′	10′	25′	40′	55′	10′	25′	40′	55′	
40	0 9.293969	9.297787	9.301584	9.305361	9.309117	9.312853	9.316568	9.320264	9.323940	9.327597	20
41	15 294032	297850	301647	305423	309179	312915	316630	320326	324001	327657	19
42	30 294096	297914	301710	305486	309242	312977	316692	320387	324062	327718	18
43	45 294160	297977	301773	305549	309304	313039	316754	320448	324124	327779	17
	41′	56′	11′	26′	41′	56′	11′	26′	41′	56′	
44	0 9.294224	9.298041	9.301836	9.305612	9.309367	9.313101	9.316815	9.320510	9.324185	9.327840	16
45	15 294288	298104	301900	305674	309429	313163	316877	320571	324246	327900	15
46	30 294351	298167	301963	305737	309491	313225	316939	320633	324307	327961	14
47	45 294415	298231	302026	305800	309554	313287	317000	320694	324368	328022	13
	42′	57′	12′	27′	42′	57′	12′	27′	42′	57′	
48	0 9.294479	9.298294	9.302089	9.305863	9.309616	9.313349	9.317062	9.320756	9.324429	9.328083	12
49	15 294543	298358	302152	305925	309678	313411	317124	320817	324490	328143	11
50	30 294607	298421	302215	305988	309741	313473	317186	320878	324551	328204	10
51	45 294670	298485	302278	306051	309803	313535	317247	320940	324612	328265	9
	43′	58′	13′	28′	43′	58′	13′	28′	43′	58′	
52	0 9.294734	9.298548	9.302341	9.306114	9.309866	9.313597	9.317309	9.321001	9.324673	9.328326	8
53	15 294798	298611	302404	306176	309928	313659	317371	321062	324734	328386	7
54	30 294861	298675	302467	306239	309990	313722	317433	321124	324795	328447	6
55	45 294925	298738	302530	306302	310053	313783	317494	321185	324856	328508	5
	44′	59′	14′	29′	44′	59′	14′	29′	44′	59′	
56	0 9.294989	9.298801	9.302593	9.306364	9.310115	9.313846	9.317556	9.321246	9.324917	9.328568	4
57	15 295053	298865	302656	306427	310177	313907	317618	321308	324978	328629	3
58	30 295116	298928	302719	306490	310240	313970	317679	321369	325039	328690	2
59	45 295180	298992	302782	306552	310302	314031	317741	321430	325100	32875[illegible]	1
60	60 9.295244	9.299055	9.302845	9.306615	9.310364	9.314094	9.317803	9.321492	9.325161	9.328811	0
sec.	29m	28m	27m	26m	25m	24m	23m	22m	21m	20m	sec.

20 Hours. 20 Hours.

3 Hours.	Log. Haversines.	3 Hours.

	40m	41m	42m	43m	44m	45m	46m	47m	48m	49m	
	55 deg.				56 deg.				57 deg.		
Sec.	′	0′	15′	30′	45′	0′	15′	30′	45′	0′	15′	Sec.
0	0	9.328811	9.332442	9.336053	9.339645	9.343219	9.346773	9.350309	9.353827	9.357326	9.360807	60
1	15	328872	332502	336113	339705	343278	346832	350368	353885	357384	360865	59
2	30	328933	332562	336173	339765	343337	346891	350427	353944	357442	360923	58
3	45	328993	332623	336233	339824	343397	346950	350485	354002	357500	360980	57
		1′	16′	31′	46′	1′	16′	31′	46′	1′	16′	
4	0	9.329054	9.332683	9.336293	9.339884	9.343456	9.347009	9.350544	9.354060	9.357558	9.361038	56
5	15	329114	332743	336353	339944	343515	347068	350603	354119	357617	361096	55
6	30	329175	332804	336413	340003	343575	347128	350662	354177	357675	361154	54
7	45	329236	332864	336473	340063	343634	347187	350720	354236	357733	361212	53
		2′	17′	32′	47′	2′	17′	32′	47′	2′	17′	
8	0	9.329296	9.332924	9.336533	9.340123	9.343694	9.347246	9.350779	9.354294	9.357791	9.361270	52
9	15	329357	332985	336593	340182	343753	347305	350838	354353	357849	361327	51
10	30	329418	333045	336653	340242	343812	347364	350897	354411	357907	361385	50
11	45	329478	333105	336713	340302	343872	347423	350955	354469	357965	361443	49
		3′	18′	33′	48′	3′	18′	33′	48′	3′	18′	
12	0	9.329539	9.333166	9.336773	9.340361	9.343931	9.347482	9.351014	9.354528	9.358023	9.361501	48
13	15	329599	333226	336833	340421	343990	347541	351073	354586	358081	361559	47
14	30	329660	333286	336893	340481	344050	347600	351131	354645	358140	361616	46
15	45	329721	333346	336953	340540	344109	347659	351190	354703	358198	361674	45
		4′	19′	34′	49′	4′	19′	34′	49′	4′	19′	
16	0	9.329781	9.333407	9.337013	9.340600	9.344168	9.347718	9.351249	9.354762	9.358256	9.361732	44
17	15	329842	333467	337073	340660	344228	347777	351308	354820	358314	361790	43
18	30	329902	333527	337133	340719	344287	347836	351366	354878	358372	361848	42
19	45	329963	333587	337193	340779	344346	347895	351425	354937	358430	361905	41
		5′	20′	35′	50′	5′	20′	35′	50′	5′	20′	
20	0	9.330024	9.333648	9.337253	9.340838	9.344406	9.347954	9.351484	9.354995	9.358488	9.361963	40
21	15	330084	333708	337312	340898	344465	348013	351542	355053	358546	362021	39
22	30	330145	333768	337372	340958	344524	348072	351601	355112	358604	362079	38
23	45	330205	333828	337432	341017	344583	348131	351660	355170	358662	362136	37
		6′	21′	36′	51′	6′	21′	36′	51′	6′	21′	
24	0	9.330266	9.333889	9.337492	9.341077	9.344643	9.348190	9.351718	9.355228	9.358720	9.362194	36
25	15	330326	333949	337552	341136	344702	348249	351777	355287	358778	362252	35
26	30	330387	334009	337612	341196	344761	348308	351836	355345	358836	362310	34
27	45	330447	334069	337672	341256	344820	348367	351894	355403	358894	362367	33
		7′	22′	37′	52′	7′	22′	37′	52′	7′	22′	
28	0	9.330508	9.334129	9.337732	9.341315	9.344880	9.348426	9.351953	9.355462	9.358953	9.362425	32
29	15	330568	334190	337792	341375	344939	348484	352011	355520	359010	362482	31
30	30	330629	334250	337852	341434	344998	348543	352070	355578	359069	362541	30
31	45	330689	334310	337911	341494	345057	348602	352129	355637	359127	362598	29
		8′	23′	38′	53′	8′	23′	38′	53′	8′	23′	
32	0	9.330750	9.334370	9.337971	9.341553	9.345117	9.348661	9.352187	9.355695	9.359185	9.362656	28
33	15	330810	334430	338031	341613	345176	348720	352246	355753	359243	362714	27
34	30	330871	334490	338091	341672	345235	348779	352305	355812	359301	362771	26
35	45	330931	334551	338151	341732	345294	348838	352363	355870	359359	362829	25
		9′	24′	39′	54′	9′	24′	39′	54′	9′	24′	
36	0	9.330992	9.334611	9.338211	9.341792	9.345354	9.348897	9.352422	9.355928	9.359417	9.362887	24
37	15	331052	334671	338270	341851	345413	348956	352480	355987	359475	362944	23
38	30	331113	334731	338330	341911	345472	349015	352539	356045	359533	363002	22
39	45	331173	334791	338390	341970	345531	349074	352597	356103	359590	363060	21
		10′	25′	40′	55′	10′	25′	40′	55′	10′	25′	
40	0	9.331234	9.334851	9.338450	9.342030	9.345590	9.349133	9.352656	9.356161	9.359649	9.363118	20
41	15	331294	334912	338510	342089	345649	349191	352715	356220	359706	363175	19
42	30	331355	334972	338570	342149	345709	349250	352773	356278	359764	363233	18
43	45	331415	335032	338629	342208	345768	349309	352832	356336	359822	363290	17
		11′	26′	41′	56′	11′	26′	41′	56′	11′	26′	
44	0	9.331475	9.335092	9.338689	9.342268	9.345827	9.349368	9.352890	9.356394	9.359880	9.363348	16
45	15	331536	335152	338749	342327	345886	349427	352949	356453	359938	363406	15
46	30	331596	335212	338809	342386	345945	349486	353007	356511	359996	363463	14
47	45	331657	335272	338869	342446	346005	349544	353066	356569	360054	363521	13
		12′	27′	42′	57′	12′	27′	42′	57′	12′	27′	
48	0	9.331717	9.335332	9.338928	9.342505	9.346064	9.349603	9.353125	9.356627	9.360112	9.363579	12
49	15	331778	335392	338988	342565	346123	349662	353183	356686	360170	363636	11
50	30	331838	335452	339048	342624	346182	349721	353242	356744	360228	363694	10
51	45	331898	335513	339108	342684	346241	349780	353300	356802	360286	363752	9
		13′	28′	43′	58′	13′	28′	43′	58′	13′	28′	
52	0	9.331959	9.335573	9.339167	9.342743	9.346300	9.349839	9.353359	9.356860	9.360344	9.363809	8
53	15	332019	335633	339227	342803	346359	349897	353417	356918	360402	363867	7
54	30	332080	335693	339287	342862	346419	349956	353476	356977	360460	363924	6
55	45	332140	335753	339347	342921	346478	350015	353534	357035	360517	363982	5
		14′	29′	44′	59′	14′	29′	44′	59′	14′	29′	
56	0	9.332200	9.335813	9.339406	9.342981	9.346537	9.350074	9.353593	9.357093	9.360575	9.364040	4
57	15	332261	335873	339466	343040	346596	350133	353651	357151	360633	364097	3
58	30	332321	335933	339526	343100	346655	350191	353710	357209	360691	364155	2
59	45	332381	335993	339586	343159	346714	350250	353768	357268	360749	364212	1
60	60	9.332442	9.336053	9.339645	9.343219	9.346773	9.350309	9.353827	9.357326	9.360807	9.364270	0
Sec.		19m	18m	17m	16m	15m	14m	13m	12m	11m	10m	Sec.

3 Hours.	Log. Haversines.	3 Hours.

	50m	51m	52m	53m	54m	55m	56m	57m	58m	59m	
sec.	57 deg.		58 deg.				59 deg.				sec.
	30'	45'	0'	15'	30'	45'	0'	15'	30'	45'	
0	0 9.364270	9.367715	9.371142	9.374552	9.377945	9.381320	9.384678	9.388018	9.391342	9.394650	60
1	15 364327	367772	371199	374609	378001	381376	384733	388074	391398	394704	59
2	30 364385	367830	371256	374666	378057	381432	384789	388130	391453	394759	58
3	45 364443	367887	371313	374722	378114	381488	384845	388185	391508	394814	57
	31'	46'	1'	16'	31'	46'	1'	16'	31'	46'	
4	0 9.364500	9.367944	9.371370	9.374779	9.378170	9.381544	9.384901	9.388241	9.391563	9.394869	56
5	15 364558	368001	371427	374836	378227	381600	384957	388296	391619	394924	55
6	30 364615	368059	371484	374892	378283	381656	385012	388352	391674	394979	54
7	45 364673	368116	371541	374949	378339	381712	385068	388407	391729	395034	53
	32'	47'	2'	17'	32'	47'	2'	17'	32'	47'	
8	0 9.364730	9.368173	9.371598	9.375006	9.378396	9.381768	9.385124	9.388463	9.391784	9.395089	52
9	15 364788	368230	371655	375062	378452	381824	385180	388518	391839	395144	51
10	30 364845	368287	371712	375119	378508	381881	385236	388574	391895	395199	50
11	45 364903	368345	371769	375176	378565	381937	385291	388629	391950	395254	49
	33'	48'	3'	18'	33'	48'	3'	18'	33'	48'	
12	0 9.364960	9.368402	9.371826	9.375232	9.378621	9.381993	9.385347	9.388685	9.392005	9.395309	48
13	15 365018	368459	371883	375289	378677	382049	385403	388740	392060	395364	47
14	30 365075	368516	371940	375345	378734	382105	385459	388796	392116	395419	46
15	45 365133	368574	371997	375402	378790	382161	385514	388851	392171	395474	45
	34'	49'	4'	19'	34'	49'	4'	19'	34'	49'	
16	0 9.365190	9.368631	9.372053	9.375459	9.378846	9.382217	9.385570	9.388907	9.392226	9.395529	44
17	15 365248	368688	372110	375515	378903	382273	385626	388962	392281	395583	43
18	30 365305	368745	372167	375572	378959	382329	385682	389017	392336	395638	42
19	45 365363	368802	372224	375628	379015	382385	385737	389073	392391	395693	41
	35'	50'	5'	20'	35'	50'	5'	20'	35'	50'	
20	0 9.365420	9.368859	9.372281	9.375685	9.379072	9.382441	9.385793	9.389128	9.392447	9.395748	40
21	15 365478	368917	372338	375742	379128	382497	385849	389184	392502	395803	39
22	30 365535	368974	372395	375798	379184	382553	385905	389239	392557	395858	38
23	45 365593	369031	372452	375855	379240	382609	385960	389295	392612	395913	37
	36'	51'	6'	21'	36'	51'	6'	21'	36'	51'	
24	0 9.365650	9.369088	9.372508	9.375911	9.379297	9.382665	9.386016	9.389350	9.392667	9.395968	36
25	15 365707	369145	372565	375968	379353	382721	386072	389405	392722	396023	35
26	30 365765	369202	372622	376024	379409	382777	386127	389461	392778	396077	34
27	45 365822	369260	372679	376081	379466	382833	386183	389516	392833	396132	33
	37'	52'	7'	22'	37'	52'	7'	22'	37'	52'	
28	0 9.365880	9.369317	9.372736	9.376138	9.379522	9.382889	9.386239	9.389572	9.392888	9.396187	32
29	15 365937	369374	372793	376194	379578	382945	386294	389627	392943	396242	31
30	30 365995	369431	372850	376251	379634	383001	386350	389683	392998	396297	30
31	45 366052	369488	372906	376307	379691	383057	386406	389738	393053	396352	29
	38'	53'	8'	23'	38'	53'	8'	23'	38'	53'	
32	0 9.366110	9.369545	9.372963	9.376364	9.379747	9.383113	9.386462	9.389793	9.393108	9.396407	28
33	15 366167	369602	373020	376420	379803	383169	386517	389849	393163	396461	27
34	30 366224	369659	373077	376478	379859	383225	386573	389904	393219	396516	26
35	45 366282	369717	373134	376533	379916	383281	386628	389959	393274	396571	25
	39'	54'	9'	24'	39'	54'	9'	24'	39'	54'	
36	0 9.366339	9.369774	9.373190	9.376590	9.379972	9.383337	9.386684	9.390015	9.393329	9.396626	24
37	15 366396	369831	373247	376646	380028	383392	386740	390070	393384	396681	23
38	30 366454	369888	373304	376703	380084	383448	386795	390126	393439	396735	22
39	45 366511	369945	373361	376759	380140	383504	386851	390181	393494	396790	21
	40'	55'	10'	25'	40'	55'	10'	25'	40'	55'	
40	0 9.366569	9.370002	9.373418	9.376816	9.380197	9.383560	9.386907	9.390236	9.393549	9.396845	20
41	15 366626	370059	373474	376872	380253	383616	386962	390292	393604	396900	19
42	30 366683	370116	373531	376929	380309	383672	387018	390347	393659	396955	18
43	45 366741	370173	373588	376985	380365	383728	387074	390402	393714	397009	17
	41'	56'	11'	26'	41'	56'	11'	26'	41'	56'	
44	0 9.366798	9.370230	9.373645	9.377042	9.380421	9.383784	9.387129	9.390458	9.393769	9.397064	16
45	15 366855	370287	373701	377098	380478	383840	387185	390513	393824	397119	15
46	30 366913	370344	373758	377155	380534	383896	387240	390568	393879	397174	14
47	45 366970	370401	373815	377211	380590	383951	387296	390624	393934	397228	13
	42'	57'	12'	27'	42'	57'	12'	27'	42'	57'	
48	0 9.367027	9.370458	9.373872	9.377268	9.380646	9.384007	9.387352	9.390679	9.393989	9.397283	12
49	15 367085	370515	373928	377324	380702	384063	387407	390734	394044	397338	11
50	30 367142	370572	373985	377380	380758	384119	387463	390790	394100	397393	10
51	45 367199	370629	374042	377437	380815	384175	387518	390845	394154	397447	9
	43'	58'	13'	28'	43'	58'	13'	28'	43'	58'	
52	0 9.367257	9.370686	9.374099	9.377493	9.380871	9.384231	9.387574	9.390900	9.394210	9.397502	8
53	15 367314	370744	374155	377550	380927	384287	387630	390955	394265	397557	7
54	30 367371	370801	374212	377606	380983	384343	387685	391011	394320	397612	6
55	45 367429	370858	374269	377663	381039	384398	387741	391066	394375	397666	5
	44'	59'	14'	29'	44'	59'	14'	29'	44'	59'	
56	0 9.367486	9.370915	9.374326	9.377719	9.381095	9.384454	9.387796	9.391121	9.394430	9.397721	4
57	15 367543	370972	374382	377775	381151	384510	387852	391177	394485	397776	3
58	30 367600	371028	374439	377832	381208	384566	387907	391232	394540	397831	2
59	45 367658	371085	374496	377888	381264	384622	387963	391287	394594	397885	1
60	60 9.367715	9.371142	9.374552	9.377945	9.381320	9.384678	9.388018	9.391342	9.394650	9.397940	0
sec.	9m	8m	7m	6m	5m	4m	3m	2m	1m	0m	sec.

4 Hours. Log. Haversines. 4 Hours.

sec.		0m	1m	2m	3m	4m	5m	6m	7m	8m	9m	sec.
		60 deg.				61 deg.				62 deg.		
		0′	15′	30′	45′	0′	15′	30′	45′	0′	15′	
0	0	9.397940	9.401214	9.404471	9.407713	9.410938	9.414147	9.417340	9.420517	9.423679	9.426825	60
1	15	397995	401268	404526	407767	410991	414200	417393	420570	423731	426877	59
2	30	398049	401323	404580	407820	411045	414253	417446	420623	423784	426929	58
3	45	398104	401377	404634	407874	411099	414307	417499	420675	423836	426981	57
		1′	16′	31′	46′	1′	16′	31′	46′	1′	16′	
4	0	9.398159	9.401432	9.404688	9.407928	9.411152	9.414360	9.417552	9.420728	9.423889	9.427034	56
5	15	398213	401486	404742	407982	411206	414413	417605	420781	423941	427086	55
6	30	398268	401540	404796	408036	411259	414467	417658	420834	423994	427138	54
7	45	398323	401595	404850	408090	411313	414520	417711	420887	424046	427191	53
		2′	17′	32′	47′	2′	17′	32′	47′	2′	17′	
8	0	9.398377	9.401649	9.404905	9.408144	9.411367	9.414573	9.417764	9.420940	9.424099	9.427243	52
9	15	398432	401704	404959	408197	411420	414627	417817	420992	424151	427295	51
10	30	398487	401758	405013	408251	411474	414680	417870	421045	424204	427347	50
11	45	398541	401812	405067	408305	411527	414733	417923	421098	424256	427400	49
		3′	18′	33′	48′	3′	18′	33′	48′	3′	18′	
12	0	9.398596	9.401867	9.405121	9.408359	9.411581	9.414787	9.417977	9.421151	9.424309	9.427452	48
13	15	398651	401921	405175	408413	411634	414840	418030	421203	424362	427504	47
14	30	398705	401975	405229	408467	411688	414893	418083	421256	424414	427556	46
15	45	398760	402030	405283	408520	411741	414946	418136	421309	424467	427609	45
		4′	19′	34′	49′	4′	19′	34′	49′	4′	19′	
16	0	9.398815	9.402084	9.405337	9.408574	9.411795	9.415000	9.418189	9.421362	9.424519	9.427661	44
17	15	398869	402139	405391	408628	411849	415053	418242	421414	424572	427713	43
18	30	398924	402193	405446	408682	411902	415106	418295	421467	424624	427765	42
19	45	398978	402247	405500	408736	411956	415160	418348	421520	424676	427818	41
		5′	20′	35′	50′	5′	20′	35′	50′	5′	20′	
20	0	9.399033	9.402302	9.405554	9.408789	9.412009	9.415213	9.418401	9.421573	9.424729	9.427870	40
21	15	399088	402356	405608	408843	412063	415266	418454	421625	424781	427922	39
22	30	399142	402410	405662	408896	412116	415319	418507	421678	424834	427974	38
23	45	399197	402465	405716	408951	412170	415373	418560	421731	424886	428026	37
		6′	21′	36′	51′	6′	21′	36′	51′	6′	21′	
24	0	9.399252	9.402519	9.405770	9.409005	9.412223	9.415426	9.418613	9.421784	9.424939	9.428079	36
25	15	399306	402573	405824	409058	412277	415479	418666	421836	424991	428131	35
26	30	399361	402628	405879	409112	412330	415532	418719	421889	425044	428183	34
27	45	399415	402682	405932	409166	412384	415586	418771	421942	425096	428235	33
		7′	22′	37′	52′	7′	22′	37′	52′	7′	22′	
28	0	9.399470	9.402736	9.405986	9.409220	9.412437	9.415639	9.418825	9.421994	9.425149	9.428287	32
29	15	399524	402790	406040	409273	412491	415692	418877	422047	425201	428340	31
30	30	399579	402845	406094	409327	412544	415745	418930	422100	425254	428392	30
31	45	399634	402899	406148	409381	412598	415798	418983	422152	425306	428444	29
		8′	23′	38′	53′	8′	23′	38′	53′	8′	23′	
32	0	9.399688	9.402953	9.406202	9.409435	9.412651	9.415852	9.419036	9.422205	9.425358	9.428496	28
33	15	399743	403008	406256	409488	412705	415905	419089	422258	425411	428548	27
34	30	399797	403062	406310	409542	412758	415958	419142	422311	425463	428601	26
35	45	399852	403116	406364	409596	412812	416011	419195	422363	425516	428653	25
		9′	24′	39′	54′	9′	24′	39′	54′	9′	24′	
36	0	9.399906	9.403170	9.406418	9.409650	9.412865	9.416065	9.419248	9.422416	9.425568	9.428705	24
37	15	399961	403225	406472	409703	412918	416118	419301	422468	425620	428757	23
38	30	400015	403279	406526	409757	412972	416171	419354	422521	425673	428809	22
39	45	400070	403333	406580	409811	413025	416224	419407	422574	425725	428861	21
		10′	25′	40′	55′	10′	25′	40′	55′	10′	25′	
40	0	9.400124	9.403387	9.406634	9.409865	9.413079	9.416277	9.419460	9.422627	9.425778	9.428913	20
41	15	400179	403442	406688	409918	413132	416330	419513	422679	425830	428965	19
42	30	400233	403496	406742	409972	413186	416384	419566	422732	425882	429018	18
43	45	400288	403550	406796	410026	413239	416437	419618	422784	425935	429070	17
		11′	26′	41′	56′	11′	26′	41′	56′	11′	26′	
44	0	9.400343	9.403604	9.406850	9.410079	9.413293	9.416490	9.419671	9.422837	9.425987	9.429122	16
45	15	400397	403659	406904	410133	413346	416543	419724	422890	426040	429174	15
46	30	400451	403713	406958	410187	413399	416596	419777	422942	426092	429226	14
47	45	400506	403767	407012	410240	413453	416649	419830	422995	426144	429278	13
		12′	27′	42′	57′	12′	27′	42′	57′	12′	27′	
48	0	9.400560	9.403821	9.407066	9.410294	9.413506	9.416702	9.419883	9.423048	9.426197	9.429330	12
49	15	400615	403875	407120	410348	413560	416756	419936	423100	426249	429382	11
50	30	400669	403930	407174	410401	413613	416809	419989	423153	426301	429434	10
51	45	400724	403984	407228	410455	413666	416862	420041	423205	426354	429486	9
		13′	28′	43′	58′	13′	28′	43′	58′	13′	28′	
52	0	9.400778	9.404038	9.407281	9.410509	9.413720	9.416915	9.420094	9.423258	9.426406	9.429539	8
53	15	400833	404092	407335	410562	413773	416968	420147	423311	426458	429591	7
54	30	400887	404146	407389	410616	413827	417021	420200	423363	426511	429643	6
55	45	400942	404201	407443	410670	413880	417074	420253	423416	426563	429695	5
		14′	29′	44′	59′	14′	29′	44′	59′	14′	29′	
56	0	9.400996	9.404255	9.407497	9.410723	9.413933	9.417127	9.420306	9.423468	9.426615	9.429747	4
57	15	401051	404309	407551	410777	413987	417181	420359	423521	426668	429799	3
58	30	401105	404363	407605	410831	414040	417234	420411	423574	426720	429851	2
59	45	401159	404417	407659	410884	414093	417287	420464	423626	426772	429903	1
60	60	9.401214	9.404471	9.407713	9.410934	9.414147	9.417340	9.420517	9.423679	9.426825	9.429955	0
sec.		59m	58m	57m	56m	55m	54m	53m	52m	51m	50m	sec.

19 Hours. 19 Hours.

4 Hours.	Log. Haversines.	4 Hours.

sec.	10m	11m	12m	13m	14m	15m	16m	17m	18m	19m	sec.
	62 deg.		63 deg.				64 deg.				
	30′	45′	0′	15′	30′	45′	0′	15′	30′	45′	
0	0 9.429955	9.433070	9.436170	9.439255	9.442325	9.445379	9.448419	9.451445	9.454455	9.457451	60
1	15 430007	433122	436222	439306	442376	445430	448470	451495	454505	457501	59
2	30 430059	433174	436273	439358	442427	445481	448520	451545	454555	457551	58
3	45 430111	433226	436325	439409	442478	445532	448571	451595	454605	457601	57
	31′	46′	1′	16′	31′	46′	1′	16′	31′	46′	
4	0 9.430163	9.433277	9.436376	9.439460	9.442529	9.445583	9.448622	9.451646	9.454655	9.457651	56
5	15 430215	433329	436428	439511	442580	445633	448672	451696	454705	457700	55
6	30 430267	433381	436479	439563	442631	445684	448723	451746	454756	457750	54
7	45 430319	433433	436531	439614	442682	445735	448773	451797	454805	457800	53
	32′	47′	2′	17′	32′	47′	2′	17′	32′	47′	
8	0 9.430371	9.433485	9.436582	9.439665	9.442733	9.445786	9.448824	9.451847	9.454856	9.457850	52
9	15 430423	433536	436634	439716	442784	445836	448874	451897	454906	457899	51
10	30 430475	433588	436685	439768	442835	445887	448925	451947	454956	457949	50
11	45 430527	433640	436737	439819	442886	445938	448975	451998	455006	457999	49
	33′	48′	3′	18′	33′	48′	3′	18′	33′	48′	
12	0 9.430579	9.433692	9.436788	9.439870	9.442937	9.445989	9.449026	9.452048	9.455056	9.458049	48
13	15 430631	433743	436840	439921	442988	446039	449076	452098	455106	458099	47
14	30 430683	433795	436891	439973	443039	446090	449127	452148	455156	458148	46
15	45 430735	433847	436943	440024	443090	446141	449177	452199	455206	458198	45
	34′	49′	4′	19′	34′	49′	4′	19′	34′	49′	
16	0 9.430787	9.433898	9.436994	9.440075	9.443141	9.446192	9.449228	9.452249	9.455256	9.458248	44
17	15 430839	433950	437046	440126	443192	446242	449278	452299	455306	458298	43
18	30 430891	434002	437097	440177	443243	446293	449329	452349	455356	458347	42
19	45 430943	434054	437149	440229	443294	446344	449379	452400	455406	458397	41
	35′	50′	5′	20′	35′	50′	5′	20′	35′	50′	
20	0 9.430995	9.434105	9.437200	9.440280	9.443345	9.446394	9.449429	9.452450	9.455456	9.458447	40
21	15 431047	434157	437252	440331	443396	446445	449480	452500	455506	458497	39
22	30 431099	434209	437303	440382	443446	446496	449530	452550	455556	458546	38
23	45 431151	434260	437354	440433	443497	446547	449581	452600	455605	458596	37
	36′	51′	6′	21′	36′	51′	6′	21′	36′	51′	
24	0 9.431203	9.434312	9.437406	9.440485	9.443548	9.446597	9.449631	9.452651	9.455655	9.458646	36
25	15 431255	434364	437457	440536	443599	446648	449682	452701	455705	458695	35
26	30 431307	434415	437509	440587	443650	446699	449732	452751	455755	458745	34
27	45 431359	434467	437560	440638	443701	446749	449783	452801	455805	458795	33
	37′	52′	7′	22′	37′	52′	7′	22′	37′	52′	
28	0 9.431411	9.434519	9.437612	9.440689	9.443752	9.446800	9.449833	9.452851	9.455855	9.458845	32
29	15 431463	434570	437663	440741	443803	446851	449883	452902	455905	458894	31
30	30 431515	434622	437714	440792	443854	446901	449934	452952	455955	458944	30
31	45 431567	434674	437766	440843	443905	446952	449984	453002	456005	458994	29
	38′	53′	8′	23′	38′	53′	8′	23′	38′	53′	
32	0 9.431618	9.434725	9.437817	9.440894	9.443956	9.447003	9.450035	9.453052	9.456055	9.459043	28
33	15 431670	434777	437869	440945	444007	447053	450085	453102	456105	459093	27
34	30 431722	434829	437920	440996	444058	447104	450136	453152	456155	459143	26
35	45 431774	434880	437971	441047	444108	447155	450186	453203	456205	459192	25
	39′	54′	9′	24′	39′	54′	9′	24′	39′	54′	
36	0 9.431826	9.434932	9.438023	9.441099	9.444159	9.447205	9.450236	9.453253	9.456255	9.459242	24
37	15 431878	434984	438074	441150	444200	447256	450287	453303	456305	459292	23
38	30 431930	435035	438126	441201	444261	447306	450337	453353	456354	459341	22
39	45 431982	435087	438177	441252	444312	447357	450387	453403	456404	459391	21
	40′	55′	10′	25′	40′	55′	10′	25′	40′	55′	
40	0 9.432034	9.435139	9.438228	9.441303	9.444363	9.447408	9.450438	9.453453	9.456454	9.459441	20
41	15 432085	435190	438280	441354	444414	447458	450488	453503	456505	459490	19
42	30 432137	435242	438331	441405	444465	447509	450539	453554	456554	459540	18
43	45 432189	435293	438382	441456	444515	447560	450589	453604	456604	459590	17
	41′	56′	11′	26′	41′	56′	11′	26′	41′	56′	
44	0 9.432241	9.435345	9.438434	9.441508	9.444566	9.447610	9.450639	9.453654	9.456654	9.459639	16
45	15 432293	435397	438485	441559	444617	447661	450690	453704	456704	459689	15
46	30 432345	435448	438537	441610	444668	447711	450740	453750	456754	459739	14
47	45 432397	435500	438588	441661	444719	447762	450790	453804	456803	459788	13
	42′	57′	12′	27′	42′	57′	12′	27′	42′	57′	
48	0 9.432449	9.435551	9.438639	9.441712	9.444770	9.447813	9.450841	9.453854	9.456853	9.459838	12
49	15 432500	435603	438691	441763	444821	447863	450891	453904	456903	459887	11
50	30 432552	435655	438742	441814	444871	447914	450941	453955	456953	459937	10
51	45 432604	435706	438793	441865	444922	447964	450992	454005	457003	459987	9
	43′	58′	13′	28′	43′	58′	13′	28′	43′	58′	
52	0 9.432656	9.435758	9.438845	9.441916	9.444973	9.448015	9.451042	9.454055	9.457053	9.460036	8
53	15 432708	435809	438896	441967	445024	448065	451092	454105	457102	460086	7
54	30 432759	435861	438947	442018	445075	448116	451143	454155	457152	460136	6
55	45 432811	435912	438998	442069	445125	448167	451193	454205	457202	460185	5
	44′	59′	14′	29′	44′	59′	14′	29′	44′	59′	
56	0 9.432863	9.435964	9.439050	9.442120	9.445176	9.448217	9.451243	9.454255	9.457252	9.460235	4
57	15 432915	436016	439101	442172	445227	448268	451294	454305	457302	460284	3
58	30 432967	436067	439152	442223	445278	448318	451344	454355	457352	460334	2
59	45 433018	436119	439204	442274	445329	448369	451394	454405	457401	460383	1
60	60 9.433070	9.436170	9.439255	9.442325	9.445379	9.448419	9.451445	9.454455	9.457451	9.460433	0
sec.	49m	48m	47m	46m	45m	44m	43m	42m	41m	40m	sec.

4 Hours.		Log. Haversines.								4 Hours.		
		20m	21m	22m	23m	24m	25m	26m	27m	28m	29m	
sec.	′	65 deg.				66 deg.				67 deg.		sec.
		0′	15′	30′	45′	0′	15′	30′	45′	0′	15′	
0	0	9.460433	9.463400	9.466354	9.469293	9.472218	9.475129	9.478026	9.480909	9.483779	9.486635	60
1	15	460483	463450	466403	469341	472266	475177	478074	480957	483827	486683	59
2	30	460532	463499	466452	469390	472315	475225	478122	481005	483874	486730	58
3	45	460582	463548	466501	469439	472363	475274	478170	481053	483922	486778	57
		1′	16′	31′	46′	1′	16′	31′	46′	1′	16′	
4	0	9.460631	9.463598	9.466550	9.469488	9.472412	9.475322	9.478218	9.481101	9.483970	9.486825	56
5	15	460681	463647	466599	469537	472461	475371	478267	481149	484018	486873	55
6	30	460730	463696	466648	469586	472509	475419	478315	481197	484065	486920	54
7	45	460780	463746	466697	469634	472558	475467	478363	481245	484113	486968	53
		2′	17′	32′	47′	2′	17′	32′	47′	2′	17′	
8	0	9.460830	9.463795	9.466746	9.469683	9.472606	9.475516	9.478411	9.481293	9.484161	9.487015	52
9	15	460879	463844	466795	469732	472655	475564	478459	481341	484208	487062	51
10	30	460929	463894	466844	469781	472704	475612	478507	481388	484256	487110	50
11	45	460978	463943	466893	469830	472752	475661	478555	481436	484304	487157	49
		3′	18′	33′	48′	3′	18′	33′	48′	3′	18′	
12	0	9.461028	9.463992	9.466942	9.469879	9.472801	9.475709	9.478604	9.481484	9.484351	9.487205	48
13	15	461077	464041	466991	469927	472849	475757	478652	481532	484399	487253	47
14	30	461127	464091	467041	469976	472898	475806	478700	481580	484447	487300	46
15	45	461176	464140	467090	470025	472947	475854	478748	481628	484494	487347	45
		4′	19′	34′	49′	4′	19′	34′	49′	4′	19′	
16	0	9.461226	9.464189	9.467139	9.470074	9.472995	9.475903	9.478796	9.481676	9.484542	9.487395	44
17	15	461275	464238	467188	470123	473044	475951	478844	481724	484590	487442	43
18	30	461325	464288	467237	470172	473092	475999	478892	481772	484637	487489	42
19	45	461374	464337	467286	470220	473141	476047	478940	481819	484685	487537	41
		5′	20′	35′	50′	5′	20′	35′	50′	5′	20′	
20	0	9.461424	9.464386	9.467335	9.470269	9.473189	9.476096	9.478988	9.481867	9.484733	9.487584	40
21	15	461473	464436	467384	470318	473238	476144	479037	481915	484780	487632	39
22	30	461523	464485	467433	470367	473287	476192	479085	481963	484828	487679	38
23	45	461572	464534	467482	470415	473335	476241	479133	482011	484875	487726	37
		6′	21′	36′	51′	6′	21′	36′	51′	6′	21′	
24	0	9.461622	9.464583	9.467531	9.470464	9.473384	9.476289	9.479181	9.482059	9.484923	9.487774	36
25	15	461671	464633	467580	470513	473432	476337	479229	482107	484971	487821	35
26	30	461721	464682	467629	470562	473481	476386	479277	482154	485018	487869	34
27	45	461770	464731	467678	470610	473529	476434	479325	482202	485066	487916	33
		7′	22′	37′	52′	7′	22′	37′	52′	7′	22′	
28	0	9.461820	9.464780	9.467727	9.470659	9.473578	9.476482	9.479373	9.482250	9.485114	9.487963	32
29	15	461869	464829	467776	470709	473626	476531	479421	482298	485161	488011	31
30	30	461919	464879	467825	470757	473675	476579	479469	482346	485209	488058	30
31	45	461968	464928	467874	470805	473723	476627	479517	482394	485256	488106	29
		8′	23′	38′	53′	8′	23′	38′	53′	8′	23′	
32	0	9.462017	9.464977	9.467923	9.470854	9.473772	9.476675	9.479565	9.482441	9.485304	9.488153	28
33	15	462067	465026	467972	470903	473820	476724	479613	482489	485352	488200	27
34	30	462116	465076	468021	470952	473869	476772	479661	482537	485399	488248	26
35	45	462166	465125	468070	471000	473917	476820	479709	482585	485447	488295	25
		9′	24′	39′	54′	9′	24′	39′	54′	9′	24′	
36	0	9.462215	9.465174	9.468119	9.471049	9.473966	9.476869	9.479757	9.482633	9.485494	9.488342	24
37	15	462265	465223	468168	471098	474014	476917	479806	482681	485542	488390	23
38	30	462314	465272	468217	471147	474063	476965	479854	482728	485589	488437	22
39	45	462363	465321	468265	471195	474111	477013	479902	482776	485637	488484	21
		10′	25′	40′	55′	10′	25′	40′	55′	10′	25′	
40	0	9.462413	9.465371	9.468314	9.471244	9.474160	9.477062	9.479950	9.482824	9.485685	9.488532	20
41	15	462462	465420	468363	471293	474208	477110	479998	482872	485732	488579	19
42	30	462512	465469	468412	471342	474257	477158	480046	482919	485780	488627	18
43	45	462561	465518	468462	471390	474305	477206	480094	482967	485827	488674	17
		11′	26′	41′	56′	11′	26′	41′	56′	11′	26′	
44	0	9.462611	9.465567	9.468510	9.471439	9.474354	9.477255	9.480142	9.483015	9.485875	9.488721	16
45	15	462660	465617	468559	471488	474402	477303	480190	483063	485922	488768	15
46	30	462709	465666	468608	471536	474451	477351	480238	483111	485971	488816	14
47	45	462759	465715	468657	471585	474499	477399	480286	483158	486017	488863	13
		12′	27′	42′	57′	12′	27′	42′	57′	12′	27′	
48	0	9.462808	9.465764	9.468706	9.471634	9.474547	9.477447	9.480334	9.483206	9.486065	9.488910	12
49	15	462857	465813	468755	471682	474596	477496	480382	483254	486113	488958	11
50	30	462907	465862	468804	471731	474644	477544	480430	483302	486160	489005	10
51	45	462956	465911	468853	471780	474693	477592	480478	483349	486208	489052	9
		13′	28′	43′	58′	13′	28′	43′	58′	13′	28′	
52	0	9.463006	9.465961	9.468901	9.471828	9.474741	9.477640	9.480526	9.483397	9.486255	9.489100	8
53	15	463055	466010	468950	471877	474790	477688	480574	483445	486303	489147	7
54	30	463104	466059	468999	471926	474838	477737	480621	483493	486350	489194	6
55	45	463154	466108	469048	471974	474886	477785	480669	483540	486398	489242	5
		14′	29′	44′	59′	14′	29′	44′	59′	14′	29′	
56	0	9.463203	9.466157	9.469097	9.472023	9.474935	9.477833	9.480717	9.483588	9.486445	9.489289	4
57	15	463252	466206	469146	472072	474983	477881	480765	483636	486493	489336	3
58	30	463302	466255	469195	472120	475032	477929	480813	483684	486540	489383	2
59	45	463351	466304	469244	472169	475080	477978	480861	483731	486588	489431	1
60	60	9.463400	9.466354	9.469293	9.472218	9.475129	9.478026	9.480909	9.483779	9.486635	9.489478	0
sec.		39m	38m	37m	36m	35m	34m	33m	32m	31m	30m	sec.

4 Hours.	Log. Haversines.	4 Hours.

	30m	31m	32m	33m	34m	35m	36m	37m	38m	39m	
sec.	67 deg.			68 deg.			69 deg.				sec.
	30'	45'	0'	15'	30'	45'	0'	15'	30'	45'	
0	0 9.489478	9.492307	9.495123	9.497926	9.500716	9.503492	9.506256	9.509007	9.511745	9.514470	60
1	15 489525	492354	495170	497973	500762	503538	506302	509053	511790	514515	59
2	30 489572	492401	495217	498019	500809	503585	506348	509098	511836	514561	58
3	45 489620	492448	495264	498066	500855	503631	506394	509144	511881	514606	57
	31'	46'	1'	16'	31'	46'	1'	16'	31'	46'	
4	0 9.489667	9.492495	9.495311	9.498112	9.500901	9.503677	9.506440	9.509190	9.511927	9.514651	56
5	15 489714	492542	495357	498159	500948	503723	506486	509235	511972	514697	55
6	30 489761	492589	495404	498206	500994	503769	506532	509281	512018	514742	54
7	45 489809	492636	495451	498252	501040	503815	506578	509327	512063	514787	53
	32'	47'	2'	17'	32'	47'	2'	17'	32'	47'	
8	0 9.489856	9.492684	9.495498	9.498299	9.501087	9.503862	9.506624	9.509373	9.512109	9.514832	52
9	15 489903	492730	495544	498346	501133	503908	506669	509418	512154	514878	51
10	30 489950	492778	495591	498392	501179	503954	506715	509464	512200	514923	50
11	45 489998	492824	495638	498438	501226	504000	506761	509510	512245	514969	49
	33'	48'	3'	18'	33'	48'	3'	18'	33'	48'	
12	0 9.490045	9.492872	9.495685	9.498485	9.501272	9.504046	9.506807	9.509555	9.512291	9.515014	48
13	15 490092	492918	495732	498532	501318	504092	506853	509601	512336	515059	47
14	30 490139	492966	495778	498578	501365	504138	506899	509647	512382	515104	46
15	45 490186	493012	495825	498625	501411	504184	506945	509692	512427	515149	45
	34'	49'	4'	19'	34'	49'	4'	19'	34'	49'	
16	0 9.490234	9.493060	9.495872	9.498671	9.501457	9.504231	9.506991	9.509738	9.512473	9.515195	44
17	15 490281	493106	495919	498718	501504	504277	507037	509784	512518	515240	43
18	30 490328	493153	495966	498764	501550	504323	507083	509830	512564	515285	42
19	45 490375	493200	496012	498811	501596	504369	507128	509875	512609	515330	41
	35'	50'	5'	20'	35'	50'	5'	20'	35'	50'	
20	0 9.490423	9.493247	9.496059	9.498857	9.501643	9.504415	9.507174	9.509921	9.512655	9.515376	40
21	15 490470	493294	496106	498904	501689	504461	507220	509967	512700	515421	39
22	30 490517	493341	496153	498951	501735	504507	507266	510012	512746	515466	38
23	45 490564	493388	496199	498997	501782	504553	507312	510058	512791	515511	37
	36'	51'	6'	21'	36'	51'	6'	21'	36'	51'	
24	0 9.490611	9.493435	9.496246	9.499044	9.501828	9.504599	9.507358	9.510104	9.512836	9.515557	36
25	15 490658	493482	496293	499090	501874	504645	507404	510149	512882	515602	35
26	30 490706	493529	496339	499137	501921	504692	507450	510195	512927	515647	34
27	45 490753	493576	496386	499183	501967	504738	507495	510240	512973	515692	33
	37'	52'	7'	22'	37'	52'	7'	22'	37'	52'	
28	0 9.490800	9.493623	9.496433	9.499230	9.502013	9.504784	9.507541	9.510286	9.513018	9.515737	32
29	15 490847	493670	496480	499276	502059	504830	507587	510332	513064	515783	31
30	30 490894	493717	496526	499323	502106	504876	507633	510377	513109	515828	30
31	45 490941	493764	496573	499369	502152	504922	507679	510423	513154	515873	29
	38'	53'	8'	23'	38'	53'	8'	23'	38'	53'	
32	0 9.490989	9.493811	9.496620	9.499416	9.502198	9.504968	9.507725	9.510469	9.513200	9.515918	28
33	15 491036	493858	496666	499462	502244	505014	507771	510514	513245	515963	27
34	30 491083	493905	496713	499509	502291	505060	507816	510560	513291	516009	26
35	45 491130	493951	496760	499555	502337	505106	507862	510605	513336	516054	25
	39'	54'	9'	24'	39'	54'	9'	24'	39'	54'	
36	0 9.491177	9.493998	9.496807	9.499601	9.502383	9.505152	9.507908	9.510651	9.513381	9.516099	24
37	15 491224	494045	496853	499648	502429	505198	507954	510697	513427	516144	23
38	30 491271	494092	496900	499694	502476	505244	508000	510742	513472	516189	22
39	45 491318	494139	496947	499741	502522	505290	508045	510788	513518	516235	21
	40'	55'	10'	25'	40'	55'	10'	25'	40'	55'	
40	0 9.491366	9.494186	9.496993	9.499787	9.502568	9.505336	9.508091	9.510834	9.513563	9.516280	20
41	15 491413	494233	497040	499834	502614	505382	508137	510879	513608	516325	19
42	30 491460	494280	497087	499880	502661	505428	508183	510925	513654	516370	18
43	45 491507	494327	497133	499927	502707	505474	508229	510970	513699	516415	17
	41'	56'	11'	26'	41'	56'	11'	26'	41'	56'	
44	0 9.491554	9.494374	9.497180	9.499973	9.502753	9.505520	9.508275	9.511016	9.513745	9.516460	16
45	15 491601	494420	497227	500019	502799	505566	508320	511061	513790	516506	15
46	30 491648	494467	497273	500066	502846	505612	508366	511107	513835	516551	14
47	45 491695	494514	497320	500112	502892	505658	508412	511153	513881	516596	13
	42'	57'	12'	27'	42'	57'	12'	27'	42'	57'	
48	0 9.491742	9.494561	9.497367	9.500159	9.502938	9.505704	9.508458	9.511198	9.513926	9.516641	12
49	15 491789	494608	497413	500205	502984	505750	508503	511244	513971	516686	11
50	30 491837	494655	497460	500252	503031	505796	508549	511289	514017	516731	10
51	45 491884	494702	497516	500298	503077	505842	508595	511335	514062	516777	9
	43'	58'	13'	28'	43'	58'	13'	28'	43'	58'	
52	0 9.491931	9.494749	9.497553	9.500345	9.503123	9.505888	9.508641	9.511380	9.514107	9.516822	8
53	15 491978	494795	497600	500391	503169	505934	508687	511426	514153	516867	7
54	30 492025	494842	497646	500437	503215	505980	508732	511472	514198	516912	6
55	45 492072	494889	497693	500484	503261	506026	508778	511517	514243	516957	5
	44'	59'	14'	29'	44'	59'	14'	29'	44'	59'	
56	0 9.492119	9.494936	9.497740	9.500530	9.503308	9.506072	9.508824	9.511563	9.514289	9.517002	4
57	15 492166	494983	497786	500577	503354	506118	508870	511608	514334	517047	3
58	30 492213	495030	497833	500623	503400	506164	508915	511654	514379	517092	2
59	45 492260	495076	497879	500669	503446	506210	508961	511699	514425	517137	1
60	60 9.492307	9.495123	9.497926	9.500716	9.503492	9.506256	9.509007	9.511745	9.514470	9.517183	0
sec.	29m	28m	27m	26m	25m	24m	23m	22m	21m	20m	sec.

4 Hours.	Log. Haversines.	4 Hours.

	40m	41m	42m	43m	44m	45m	46m	47m	48m	49m	
sec.	70 deg.				71 deg.				72 deg.		sec.
	0′	15′	30′	45′	0′	15′	30′	45′	0′	15′	
0	0 9.517183	9.519883	9.522570	9.525245	9.527908	9.530559	9.533197	9.535823	9.538437	9.541040	60
1	15 517228	519928	522615	525290	527952	530603	533241	535867	538481	541083	59
2	30 517273	519972	522660	525334	527997	530647	533285	535911	538524	541126	58
3	45 517318	520017	522704	525379	528041	530691	533328	535954	538568	541169	57
	1′	16′	31′	46′	1′	16′	31′	46′	1′	16′	
4	0 9.517363	9.520062	9.522749	9.525423	9.528085	9.530735	9.533372	9.535998	9.538611	9.541213	56
5	15 517408	520107	522794	525468	528129	530779	533416	536041	538655	541256	55
6	30 517453	520152	522838	525512	528174	530823	533460	536085	538698	541299	54
7	45 517498	520197	522883	525557	528218	530867	533504	536129	538741	541342	53
	2′	17′	32′	47′	2′	17′	32′	47′	2′	17′	
8	0 9.517543	9.520242	9.522928	9.525601	9.528262	9.530911	9.533548	9.536172	9.538785	9.541386	52
9	15 517588	520287	522972	525645	528306	530955	533592	536216	538828	541429	51
10	30 517633	520331	523017	525690	528351	530999	533635	536260	538872	541472	50
11	45 517679	520376	523062	525734	528395	531043	533679	536303	538915	541515	49
	3′	18′	33′	48′	3′	18′	33′	48′	3′	18′	
12	0 9.517724	9.520421	9.523106	9.525779	9.528439	9.531087	9.533723	9.536347	9.538959	9.541559	48
13	15 517769	520466	523151	525823	528483	531131	533767	536391	539003	541602	47
14	30 517814	520511	523195	525868	528528	531175	533811	536434	539046	541645	46
15	45 517859	520556	523240	525912	528572	531219	533855	536478	539089	541688	45
	4′	19′	34′	49′	4′	19′	34′	49′	4′	19′	
16	0 9.517904	9.520601	9.523285	9.523957	9.528616	9.531263	9.533898	9.536521	9.539132	9.541732	44
17	15 517949	520645	523329	526001	528660	531307	533942	536565	539176	541775	43
18	30 517994	520690	523374	526045	528705	531351	533986	536609	539219	541818	42
19	45 518039	520735	523419	526089	528749	531395	534030	536652	539263	541861	41
	5′	20′	35′	50′	5′	20′	35′	50′	5′	20′	
20	0 9.518084	9.520780	9.523463	9.526134	9.528793	9.531439	9.534074	9.536696	9.539306	9.541904	40
21	15 518129	520825	523508	526179	528837	531483	534117	536739	539349	541947	39
22	30 518174	520870	523552	526223	528881	531527	534161	536783	539393	541991	38
23	45 518219	520914	523597	526267	528926	531571	534205	536827	539436	542034	37
	6′	21′	36′	51′	6′	21′	36′	51′	6′	21′	
24	0 9.518264	9.520959	9.523642	9.526312	9.528970	9.531615	9.534249	9.536870	9.539480	9.542077	36
25	15 518309	521004	523686	526356	529014	531659	534293	536914	539523	542120	35
26	30 518354	521049	523731	526401	529058	531703	534336	536957	539566	542164	34
27	45 518399	521094	523775	526445	529102	531747	534380	537001	539610	542207	33
	7′	22′	37′	52′	7′	22′	37′	52′	7′	22′	
28	0 9.518444	9.521138	9.523820	9.526489	9.529147	9.531791	9.534424	9.537045	9.539653	9.542250	32
29	15 518489	521183	523865	526534	529191	531835	534468	537089	539697	542293	31
30	30 518534	521228	523909	526578	529235	531879	534512	537132	539740	542336	30
31	45 518579	521273	523954	526623	529279	531923	534555	537175	539783	542379	29
	8′	23′	38′	53′	8′	23′	38′	53′	8′	23′	
32	0 9.518624	9.521318	9.523998	9.526667	9.529323	9.531967	9.534599	9.537219	9.539827	9.542423	28
33	15 518669	521362	524043	526711	529367	532011	534643	537262	539870	542466	27
34	30 518714	521407	524088	526756	529412	532055	534687	537306	539913	542509	26
35	45 518759	521452	524132	526800	529456	532099	534730	537349	539957	542552	25
	9′	24′	39′	54′	9′	24′	39′	54′	9′	24′	
36	0 9.518804	9.521497	9.524177	9.526844	9.529500	9.532143	9.534774	9.537393	9.540000	9.542595	24
37	15 518849	521541	524221	526889	529544	532187	534818	537437	540043	542638	23
38	30 518894	521586	524266	526933	529588	532231	534862	537480	540087	542682	22
39	45 518939	521631	524310	526977	529632	532275	534905	537524	540130	542725	21
	10′	25′	40′	55′	10′	25′	40′	55′	10′	25′	
40	0 9.518984	9.521676	9.524355	9.527022	9.529676	9.532319	9.534949	9.537567	9.540174	9.542768	20
41	15 519029	521720	524399	527066	529721	532363	534993	537611	540217	542811	19
42	30 519074	521765	524444	527111	529765	532407	535037	537654	540260	542854	18
43	45 519119	521810	524489	527155	529809	532451	535080	537698	540303	542897	17
	11′	26′	41′	56′	11′	26′	41′	56′	11′	26′	
44	0 9.519164	9.521855	9.524533	9.527199	9.529853	9.532495	9.535124	9.537741	9.540347	9.542940	16
45	15 519209	521899	524578	527243	529897	532539	535168	537785	540390	542983	15
46	30 519254	521944	524622	527288	529941	532582	535211	537828	540433	543027	14
47	45 519299	521989	524667	527332	529985	532626	535255	537872	540477	543070	13
	12′	27′	42′	57′	12′	27′	42′	57′	12′	27′	
48	0 9.519344	9.522034	9.524711	9.527376	9.530029	9.532670	9.535299	9.537915	9.540520	9.543113	12
49	15 519389	522078	524756	527421	530074	532714	535343	537959	540563	543156	11
50	30 519433	522123	524800	527465	530118	532758	535386	538003	540607	543199	10
51	45 519478	522168	524845	527509	530162	532802	535430	538046	540650	543242	9
	13′	28′	43′	58′	13′	28′	43′	58′	13′	28′	
52	0 9.519523	9.522213	9.524889	9.527554	9.530206	9.532846	9.535474	9.538090	9.540693	9.543285	8
53	15 519568	522257	524934	527598	530250	532890	535517	538133	540737	543328	7
54	30 519613	522302	524978	527642	530294	532934	535561	538176	540780	543371	6
55	45 519658	522347	525023	527687	530338	532977	535605	538220	540823	543414	5
	14′	29′	44′	59′	14′	29′	44	59′	14′	29′	
56	0 9.519703	9.522391	9.525067	9.527731	9.530382	9.533021	9.535648	9.538263	9.540866	9.543458	4
57	15 519748	522436	525112	527775	530426	533065	535692	538307	540910	543501	3
58	30 519793	522481	525156	527820	530470	533109	535736	538350	540953	543544	2
59	45 519838	522525	525201	527864	530514	533153	535779	538394	540997	543587	1
60	60 9.519883	9.522570	9.525245	9.527908	9.530559	9.533197	9.535823	9.538437	9.541040	9.543630	0
sec.	19m	18m	17m	16m	15m	14m	13m	12m	11m	10m	sec.

4 Hours.	Log. Haversines.									4 Hours.	
	50m	51m	52m	53m	54m	55m	56m	57m	58m	59m	
sec.	72 deg.		73 deg.				74 deg.				sec.
	″ 30′	45′	0′	15′	30′	45′	0′	15′	30′	45′	
0	0 9.543630	9.546208	9.548775	9.551330	9.553874	9.556406	9.558926	9.561435	9.563933	9.566419	60
1	15 543673	546251	548818	551373	553916	556448	558968	561477	563974	566460	59
2	30 543716	546294	548861	551415	553958	556490	559010	561518	564016	566502	58
3	45 543759	546337	548903	551458	554001	556532	559052	561560	564057	566543	57
	31′	46′	1′	16′	31′	46′	1′	16′	31′	46′	
4	0 9.543802	9.546380	9.548946	9.551500	9.554043	9.556574	9.559094	9.561602	9.564099	9.566584	56
5	15 543845	546423	548989	551543	554085	556616	559136	561644	564140	566626	55
6	30 543888	546466	549031	551585	554127	556658	559177	561685	564182	566667	54
7	45 543931	546508	549074	551628	554170	556700	559219	561727	564223	566708	53
	32′	47′	2′	17′	32′	47′	2′	17′	32′	47′	
8	0 9.543974	9.546551	9.549117	9.551670	9.554212	9.556742	9.559261	9.561769	9.564265	9.566750	52
9	15 544017	546594	549159	551712	554254	556784	559303	561810	564306	566791	51
10	30 544061	546637	549202	551755	554297	556826	559345	561852	564348	566832	50
11	45 544103	546680	549244	551797	554339	556869	559387	561894	564389	566874	49
	33′	48′	3′	18′	33′	48′	3′	18′	33′	48′	
12	0 9.544147	9.546723	9.549287	9.551840	9.554381	9.556911	9.559429	9.561935	9.564431	9.566915	48
13	15 544190	546766	549330	551882	554423	556953	559471	561977	564472	566956	47
14	30 544233	546808	549372	551925	554466	556995	559513	562019	564514	566998	46
15	45 544276	546851	549415	551967	554507	557037	559554	562061	564555	567039	45
	34′	49′	4′	19′	34′	49′	4′	19′	34′	49′	
16	0 9.544319	9.546894	9.549458	9.552010	9.554550	9.557079	9.559596	9.562102	9.564597	9.567080	44
17	15 544362	546937	549500	552052	554592	557121	559638	562144	564638	567121	43
18	30 544405	546980	549543	552095	554635	557163	559680	562186	564680	567163	42
19	45 544448	547022	549586	552137	554677	557205	559722	562227	564721	567204	41
	35′	50′	5′	20′	35′	50′	5′	20′	35′	50′	
20	0 9.544491	9.547065	9.549628	9.552179	9.554719	9.557247	9.559764	9.562269	9.564763	9.567245	40
21	15 544534	547108	549671	552222	554761	557289	559805	562311	564804	567287	39
22	30 544577	547151	549713	552264	554803	557331	559847	562352	564846	567328	38
23	45 544620	547194	549756	552307	554846	557373	559889	562394	564887	567369	37
	36′	51′	6′	21′	36′	51′	6′	21	36′	51′	
24	0 9.544663	9.547237	9.549799	9.552349	9.554888	9.557415	9.559931	9.562435	9.564929	9.567411	36
25	15 544706	547279	549841	552391	554930	557457	559973	562477	564970	567452	35
26	30 544749	547322	549884	552434	554972	557499	560015	562519	565012	567493	34
27	45 544792	547365	549927	552476	555014	557541	560057	562560	565053	567534	33
	37′	52′	7′	22′	37′	52′	7′	22′	37′	52′	
28	0 9.544835	9.547408	9.549969	9.552519	9.555057	9.557583	9.560098	9.562602	9.565094	9.567576	32
29	15 544878	547450	550012	552561	555099	557625	560140	562644	565136	567617	31
30	30 544921	547493	550054	552603	555141	557667	560182	562685	565177	567658	30
31	45 544964	547536	550097	552646	555183	557709	560224	562727	565219	567699	29
	38′	53′	8′	23′	38′	53′	8′	23′	38′	53′	
32	0 9.545007	9.547579	9.550139	9.552688	9.555226	9.557751	9.560266	9.562769	9.565260	9.567741	28
33	15 545050	547622	550182	552731	555268	557793	560307	562810	565302	567782	27
34	30 545093	547664	550224	552773	555310	557835	560349	562852	565343	567823	26
35	45 545135	547707	550267	552815	555352	557877	560391	562893	565384	567864	25
	39′	54′	9′	24′	39′	54′	9′	24′	39′	54′	
36	0 9.545178	9.547750	9.550310	9.552858	9.555394	9.557919	9.560433	9.562935	9.565426	9.567906	24
37	15 545221	547793	550352	552900	555436	557961	560475	562977	565467	567947	23
38	30 545264	547835	550395	552942	555479	558003	560516	563018	565509	567988	22
39	45 545307	547878	550437	552985	555521	558045	560558	563060	565550	568029	21
	40′	55′	10′	25′	40′	55′	10′	25′	40′	55′	
40	0 9.545350	9.547921	9.550480	9.553027	9.555563	9.558087	9.560600	9.563101	9 565592	9.568070	20
41	15 545393	547964	550522	553070	555605	558129	560642	563143	565633	568112	19
42	30 545436	548006	550565	553112	555647	558171	560684	563185	565674	568153	18
43	45 545479	548049	550607	553154	555689	558213	560725	563226	565716	568194	17
	41′	56′	11′	26′	41′	56′	11′	26′	41′	56′	
44	0 9.545522	9.548092	9.550650	9.553197	9.555732	9.558255	9.560767	9.563268	9.565757	9.568235	16
45	15 545565	548135	550693	553239	555774	558297	560809	563309	565798	568276	15
46	30 545608	548177	550735	553281	555816	558339	560851	563351	565840	568318	14
47	45 545651	548220	550778	553324	555858	558381	560892	563392	565881	568359	13
	42′	57′	12′	27′	42′	57′	12′	27′	42′	57′	
48	0 9.545694	9.548263	9.550820	9.553366	9.555900	9.558423	9.560934	9.563434	9.565923	9.568400	12
49	15 545737	548305	550863	553408	555942	558465	560976	563476	565964	568441	11
50	30 545780	548348	550905	553451	555984	558507	561018	563517	566005	568483	10
51	45 545822	548391	550948	553493	556027	558549	561059	563559	566047	568524	9
	43′	58′	13′	28′	43′	58′	13′	28′	43′	59′	
52	0 9.545865	9.548434	9.550990	9.553535	9.556069	9.558591	9.561101	9.563600	9.566088	9.568565	8
53	15 545908	548476	551033	553578	556111	558633	561143	563642	566130	568606	7
54	30 545951	548519	551075	553620	556153	558675	561185	563683	566171	568647	6
55	45 545994	548562	551118	553662	556195	558716	561226	563725	566212	568688	5
	44′	59′	14′	29′	44′	59′	14′	29′	44′	59′	
56	0 9.546037	9.548604	9.551160	9.553705	9.556237	9.558758	9.561268	9.563767	9.566254	9.568730	4
57	15 546080	548647	551203	553747	556279	558800	561310	563808	566295	568771	3
58	30 546123	548690	551245	553789	556321	558842	561352	563850	566336	568812	2
59	45 546166	548732	551288	553831	556364	558884	561393	563891	566378	568853	1
60	0 9.546208	9.548775	9.551330	9.553874	9.556406	9.558926	9.561435	9.563933	9.566419	9.568894	0
sec.	9m	8m	7m	6m	5m	4m	3m	2m	1m	0m	sec.

19 Hours. 19 Hours.

5 Hours.					Log. Haversines.				5 Hours.		
	0m	1m	2m	3m	4m	5m	6m	7m	8m	9m	
	75 deg.				76 deg.				77 deg.		
sec.	′	0′	15′	30′	45′	0′	15′	30′	45′	0′	15′	sec.
0	0	9.568894	9.571358	9.573811	9.576253	9.578684	9.581104	9.583513	9.585911	9.588299	9.590676	60
1	15	568935	571399	573852	576294	578724	581144	583553	585951	588339	590716	59
2	30	568977	571440	573893	576334	578765	581184	583593	585991	588379	590755	58
3	45	569018	571481	573933	576375	578805	581225	583633	586031	588418	590795	57
		1′	16′	31′	46′	1′	16′	31′	46′	1′	16′	
4	0	9.569059	9.571522	9.573974	9.576415	9.578846	9.581265	9.583673	9.586071	9.588458	9.590834	56
5	15	569100	571563	574015	576456	578886	581305	583713	586111	588498	590874	55
6	30	569141	571604	574056	576497	578926	581345	583753	586151	588537	590913	54
7	45	569182	571645	574097	576537	578967	581386	583793	586191	588577	590953	53
		2′	17′	32′	47′	2′	17′	32′	47′	2′	17′	
8	0	9.569223	9.571686	9.574137	9.576578	9.579007	9.581426	9.583834	9.586230	9.588617	9.590992	52
9	15	569265	571727	574178	576618	579048	581466	583873	586270	588656	591032	51
10	30	569306	571768	574219	576659	579088	581506	583914	586310	588696	591071	50
11	45	569347	571809	574260	576699	579128	581546	583954	586350	588736	591111	49
		3′	18′	33′	48′	3′	18′	33′	48′	3′	18′	
12	0	9.569388	9.571850	9.574300	9.576740	9.579169	9.581587	9.583994	9.586390	9.588775	9.591150	48
13	15	569429	571891	574341	576781	579209	581627	584034	586430	588815	591190	47
14	30	569470	571932	574382	576821	579250	581667	584074	586470	588855	591229	46
15	45	569511	571973	574423	576862	579290	581707	584114	586509	588894	591269	45
		4′	19′	34′	49′	4′	19′	34′	49′	4′	19′	
16	0	9.569552	9.572013	9.574463	9.576902	9.579330	9.581747	9.584154	9.586549	9.588934	9.591308	44
17	15	569593	572054	574504	576943	579371	581788	584194	586589	588974	591348	43
18	30	569635	572095	574545	576983	579411	581828	584234	586629	589013	591387	42
19	45	569676	572136	574586	577024	579451	581868	584274	586669	589053	591427	41
		5′	20′	35′	50′	5′	20′	35′	50′	5′	20′	
20	0	9.569717	9.572177	9.574626	9.577065	9.579492	9.581908	9.584314	9.586709	9.589093	9.591466	40
21	15	569758	572218	574667	577105	579532	581948	584354	586748	589132	591506	39
22	30	569799	572259	574708	577146	579573	581989	584394	586788	589172	591545	38
23	45	569840	572300	574748	577186	579613	582029	584434	586828	589212	591584	37
		6′	21′	36′	51′	6′	21′	36′	51′	6′	21′	
24	0	9.569881	9.572341	9.574789	9.577227	9.579653	9.582069	9.584474	9.586868	9.589251	9.591624	36
25	15	569922	572382	574830	577267	579694	582109	584514	586908	589291	591663	35
26	30	569963	572423	574871	577308	579734	582149	584554	586947	589330	591703	34
27	45	570004	572463	574911	577348	579774	582189	584594	586987	589370	591742	33
		7′	22′	37′	52′	7′	22′	37′	52′	7′	22′	
28	0	9.570046	9.572504	9.574952	9.577389	9.579815	9.582230	9.584634	9.587027	9.589410	9.591782	32
29	15	570087	572545	574993	577429	579855	582270	584674	587067	589450	591821	31
30	30	570128	572586	575033	577470	579895	582310	584714	587107	589489	591861	30
31	45	570169	572627	575074	577510	579936	582350	584754	587146	589529	591900	29
		8′	23′	38′	53′	8′	23′	38′	53′	8′	23′	
32	0	9.570210	9.572668	9.575115	9.577551	9.579976	9.582390	9.584794	9.587186	9.589568	9.591939	28
33	15	570251	572709	575155	577591	580016	582430	584833	587226	589608	591979	27
34	30	570292	572750	575196	577632	580057	582470	584874	587266	589647	592018	26
35	45	570333	572790	575237	577672	580097	582511	584913	587306	589687	592058	25
		9′	24′	39′	54′	9′	24′	39′	54′	9′	24′	
36	0	9.570374	9.572831	9.575278	9.577713	9.580137	9.582551	9.584953	9.587345	9.589727	9.592097	24
37	15	570415	572872	575318	577753	580177	582591	584993	587385	589766	592137	23
38	30	570456	572913	575359	577794	580218	582631	585033	587425	589806	592176	22
39	45	570497	572954	575400	577834	580258	582671	585073	587465	589845	592215	21
		10′	25′	40′	55′	10′	25′	40′	55′	10′	25′	
40	0	9.570538	9.572995	9.575440	9.577875	9.580299	9.582711	9.585113	9.587504	9.589885	9.592255	20
41	15	570579	573036	575480	577915	580339	582751	585153	587544	589924	592294	19
42	30	570620	573076	575522	577956	580379	582792	585193	587584	589964	592334	18
43	45	570661	573117	575562	577996	580419	582832	585233	587624	590004	592373	17
		11′	26′	41′	56′	11′	26′	41′	56′	11′	26′	
44	0	9.570702	9.573158	9.575603	9.578037	9.580460	9.582872	9.585273	9.587663	9.590043	9.592412	16
45	15	570743	573199	575644	578077	580500	582912	585313	587703	590083	592452	15
46	30	570784	573240	575684	578118	580540	582952	585353	587743	590122	592491	14
47	45	570825	573281	575725	578158	580580	582992	585393	587783	590162	592531	13
		12′	27′	42′	57′	12′	27′	42′	57′	12′	27′	
48	0	9.570866	9.573321	9.575766	9.578199	9.580621	9.583032	9.585433	9.587822	9.590202	9.592570	12
49	15	570907	573362	575806	578239	580661	583072	585473	587862	590241	592609	11
50	30	570948	573403	575847	578280	580701	583112	585513	587902	590281	592649	10
51	45	570989	573444	575887	578320	580742	583152	585552	587942	590320	592688	9
		13′	28′	43′	58′	13′	28′	43′	58′	13′	28′	
52	0	9.571030	9.573485	9.575928	9.578360	9.580782	9.583193	9.585592	9.587981	9.590360	9.592728	8
53	15	571071	573525	575969	578401	580822	583233	585632	588021	590399	592767	7
54	30	571112	573566	576009	578441	580862	583273	585672	588061	590439	592806	6
55	45	571153	573607	576050	578482	580903	583313	585712	588101	590478	592846	5
		14′	29′	44′	59′	14′	29′	44′	59′	14′	29′	
56	0	9.571194	9.573648	9.576091	9.578522	9.580943	9.583353	9.585752	9.588140	9.590518	9.592885	4
57	15	571235	573689	576131	578563	580983	583393	585792	588180	590557	592924	3
58	30	571276	573730	576172	578603	581023	583433	585832	588220	590597	592964	2
59	45	571317	573770	576212	578643	581064	583473	585872	588259	590637	593003	1
60	60	9.571358	9.573811	9.576253	9.578684	9.581104	9.583513	9.585911	9.588299	9.590676	9.593042	0
sec.		59m	58m	57m	56m	55m	54m	53m	52m	51m	50m	sec.

5 Hours.	Log. Haversines.										5 Hours.
	10m	11m	12m	13m	14m	15m	16m	17m	18m	19m	
	77 deg.		78 deg.				79 deg.				
sec.											sec.
	,30'	45'	0'	15'	30'	45'	0'	15'	30'	45'	
0	0 9.593042	9.595398	9.597744	9.600078	9.602403	9.604717	9.607021	9.609315	9.611598	9.613872	60
1	15 593082	595437	597783	600117	602442	604756	607059	609353	611636	613909	59
2	30 593121	595477	597822	600156	602480	604794	607098	609391	611674	613947	58
3	45 593160	595516	597861	600195	602519	604833	607136	609429	611712	613985	57
	31'	46'	1	16'	31'	46'	1'	16'	31'	46'	
4	0 9.593200	9.595555	9.597900	9.600234	9.602558	9.604871	9.607174	9.609467	9.611750	9.614023	56
5	15 593239	595594	597939	600273	602596	604910	607213	609505	611788	614061	55
6	30 593279	595633	597978	600311	602635	604948	607251	609544	611826	614098	54
7	45 593318	595672	598017	600350	602673	604987	607289	609582	611864	614136	53
	32'	47'	2'	17'	32'	47'	2'	17'	32'	47'	
8	0 9.593357	9.595712	9.598056	9.600389	9.602712	9.605025	9.607327	9.609620	9.611902	9.614174	52
9	15 593396	595751	598095	600428	602751	605063	607366	609658	611940	614212	51
10	30 593436	595790	598133	600467	602789	605102	607404	609696	611978	614250	50
11	45 593475	595829	598172	600506	602828	605140	607442	609734	612016	614287	49
	33'	48'	3'	18'	33'	48'	3'	18'	33'	48'	
12	0 9.593514	9.595868	9.598211	9.600544	9.602867	9.605179	9.607481	9.609772	9.612054	9.614325	48
13	15 593554	595907	598250	600583	602905	605217	607519	609810	612092	614363	47
14	30 593593	595946	598289	600622	602944	605256	607557	609848	612130	614401	46
15	45 593632	595985	598328	600661	602983	605294	607595	609886	612167	614438	45
	34'	49'	4'	19'	34'	49'	4'	19'	34'	49'	
16	0 9.593672	9.596025	9.598367	9.600699	9.603021	9.605333	9.607634	9.609925	9.612205	9.614476	44
17	15 593711	596064	598406	600738	603059	605371	607672	609963	612243	614514	43
18	30 593750	596103	598445	600777	603098	605409	607710	610001	612281	614552	42
19	45 593789	596142	598484	600816	603137	605448	607748	610039	612319	614590	41
	35'	50'	5'	20'	35'	50'	5'	20'	35'	50'	
20	0 9.593829	9.596181	9.598523	9.600854	9.603176	9.605486	9.607787	9.610077	9.612357	9.614627	40
21	15 593868	596220	598562	600893	603215	605525	607825	610115	612395	614665	39
22	30 593907	596259	598601	600932	603253	605563	607863	610153	612433	614703	38
23	45 593947	596299	598640	600971	603291	605601	607901	610191	612471	614740	37
	36'	51'	6'	21'	36'	51'	6'	21'	36'	51'	
24	0 9.593986	9.596338	9.598679	9.601010	9.603330	9.605640	9.607940	9.610229	9.612509	9.614779	36
25	15 594025	596377	598718	601048	603368	605678	607978	610267	612547	614816	35
26	30 594065	596416	598757	601087	603407	605717	608016	610305	612585	614854	34
27	45 594104	596455	598796	601126	603446	605755	608054	610344	612622	614892	33
	37'	52'	7'	22'	37'	52'	7'	22'	37'	52'	
28	0 9.594143	9.596494	9.598835	9.601165	9.603484	9.605794	9.608093	9.610382	9.612660	9.614929	32
29	15 594182	596533	598873	601203	603523	605832	608131	610420	612698	614967	31
30	30 594222	596572	598912	601242	603561	605870	608169	610458	612736	615005	30
31	45 594261	596611	598951	601281	603600	605909	608207	610496	612774	615042	29
	38'	53'	8'	23'	38'	53'	8'	23'	38'	53'	
32	0 9.594300	9.596650	9.598990	9.601320	9.603638	9.605947	9.608246	9.610534	9.612812	9.615080	28
33	15 594339	596689	599029	601358	603677	605986	608284	610572	612850	615118	27
34	30 594379	596729	599068	601397	603716	606024	608322	610610	612888	615155	26
35	45 594418	596768	599107	601436	603754	606062	608360	610648	612926	615193	25
	39'	54'	9'	24'	39'	54'	9'	24'	39'	54'	
36	0 9.594457	9.596807	9.599146	9.601474	9.603793	9.606101	9.608398	9.610686	9.612963	9.615231	24
37	15 594496	596846	599185	601513	603831	606139	608436	610724	613001	615268	23
38	30 594536	596885	599224	601552	603870	606177	608475	610762	613039	615306	22
39	45 594575	596924	599262	601591	603908	606216	608513	610800	613077	615344	21
	40'	55'	10'	25'	40'	55'	10'	25'	40'	55'	
40	0 9.594614	9.596963	9.599301	9.601629	9.603947	9.606254	9.608551	9.610838	9.613115	9.615382	20
41	15 594653	597002	599340	601668	603985	606293	608589	610876	613153	615419	19
42	30 594693	597041	599379	601707	604024	606331	608628	610914	613191	615457	18
43	45 594732	597080	599418	601745	604063	606369	608666	610952	613228	615495	17
	41'	56'	11'	26'	41'	56'	11'	26'	41'	56'	
44	0 9.594771	9.597119	9.599457	9.601784	9.604101	9.606408	9.608704	9.610990	9.613266	9.615532	16
45	15 594810	597158	599496	601823	604140	606446	608742	611028	613304	615570	15
46	30 594850	597197	599535	601862	604178	606484	608780	611066	613342	615608	14
47	45 594889	597236	599573	601900	604217	606523	608818	611104	613380	615645	13
	42'	57'	12'	27'	42'	57'	12'	27'	42'	57'	
48	0 9.594928	9.597275	9.599612	9.601939	9.604255	9.606561	9.608857	9.611142	9.613418	9.615683	12
49	15 594967	597314	599651	601978	604294	606599	608895	611180	613456	615721	11
50	30 595006	597353	599690	602016	604332	606638	608933	611218	613493	615758	10
51	45 595046	597392	599729	602055	604371	606676	608971	611256	613531	615796	9
	43'	58'	13'	28'	43'	58'	13'	28'	43'	58'	
52	0 9.595085	9.597432	9.599768	9.602094	9.604409	9.606714	9.609009	9.611294	9.613569	9.615834	8
53	15 595124	597471	599807	602132	604448	606753	609048	611332	613607	615872	7
54	30 595163	597510	599845	602171	604486	606791	609086	611370	613645	615909	6
55	45 595202	597549	599884	602210	604525	606829	609124	611408	613683	615947	5
	44'	59'	14'	29'	44'	59'	14'	29'	44'	59'	
56	0 9.595242	9.597588	9.599923	9.602248	9.604563	9.606868	9.609162	9.611446	9.613720	9.615984	4
57	15 595281	597627	599962	602287	604602	606906	609200	611484	613758	616022	3
58	30 595320	597666	600001	602326	604640	606944	609238	611522	613796	616060	2
59	15 595359	597705	600040	602364	604679	606983	609277	611560	613834	616097	1
60	60 9.595398	9.597744	9.600078	9.602403	9.604717	9.607021	9.609315	9.611598	9.613872	9.616135	0
sec.	49m	48m	47m	46m	45m	44m	43m	42m	41m	40m	sec.

5 Hours. Log. Haversines. 5 Hours.

sec.	20m	21m	22m	23m	24m	25m	26m	27m	28m	29m	sec.
	80 deg.				81 deg.				82 deg.		
	° 0′	15′	30′	45′	0′	15′	30′	45′	0′	15′	
0	0 9.616135	9.618388	9.620632	9.622865	9.625089	9.627303	9.629507	9.631701	9.633886	9.636061	60
1	15 616173	618426	620669	622902	625126	627339	629533	631738	633922	636097	59
2	30 616210	618463	620706	622939	625163	627376	629580	631774	633958	636133	58
3	45 616248	618501	620744	622977	625199	627413	629617	631811	633995	636169	57
	1′	16′	31′	46′	1′	16′	31′	46′	1′	16′	
4	0 9.616286	9.618538	9.620781	9.623014	9.625237	9.627450	9.629653	9.631847	9.634031	9.636208	56
5	15 616323	618576	620818	623051	625274	627487	629690	631884	634067	636242	55
6	30 616361	618613	620856	623088	625311	627524	629727	631920	634104	636278	54
7	45 616398	618650	620893	623125	625348	627561	629763	631956	634140	636314	53
	2′	17′	32′	47′	2′	17′	32′	47′	2′	17′	
8	0 9.616436	9.618688	9.620930	9.623162	9.625385	9.627597	9.629800	9.631993	9.634176	9.636350	52
9	15 616474	618725	620967	623199	625421	627634	629836	632029	634213	636386	51
10	30 616511	618763	621005	623236	625458	627671	629873	632066	634249	636423	50
11	45 616548	618800	621042	623274	625495	627707	629910	632102	634285	636459	49
	3′	18′	33′	48′	3′	18′	33′	48′	3′	18′	
12	0 9.616586	9.618838	9.621079	9.623311	9.625532	9.627744	9.629946	9.632139	9.634322	9.636495	48
13	15 616624	618875	621116	623348	625569	627781	629983	632175	634358	636531	47
14	30 616662	618913	621154	623385	625606	627818	630020	632212	634394	636567	46
15	45 616699	618950	621191	623422	625643	627855	630056	632248	634430	636603	45
	4′	19′	34′	49′	4′	19′	34′	49′	4′	19′	
16	0 9.616737	9.618988	9.621228	9.623459	9.625680	9.627891	9.630093	9.632285	9.634467	9.636639	44
17	15 616774	619025	621265	623496	625717	627928	630129	632321	634503	636675	43
18	30 616812	619062	621303	623533	625754	627965	630166	632358	634539	636712	42
19	45 616850	619100	621340	623570	625791	628002	630203	632394	634576	636748	41
	5′	20′	35′	50′	5′	20′	35′	50′	5′	20′	
20	0 9.616887	9.619137	9.621377	9.623608	9.625828	9.628038	9.630239	9.632430	9.634612	9.636784	40
21	15 616925	619175	621414	623645	625865	628075	630276	632467	634648	636820	39
22	30 616962	619212	621452	623682	625902	628112	630312	632503	634684	636856	38
23	45 617000	619249	621489	623719	625939	628149	630349	632540	634721	636892	37
	6′	21′	36′	51′	6′	21′	36′	51′	6′	21′	
24	0 9.617038	9.619287	9.621526	9.623756	9.625976	9.628185	9.630386	9.632576	9.634757	9.636928	36
25	15 617075	619324	621563	623793	626012	628222	630422	632613	634793	636964	35
26	30 617113	619362	621601	623830	626049	628259	630459	632649	634830	637001	34
27	45 617150	619399	621638	623867	626086	628296	630495	632685	634866	637037	33
	7′	22′	37′	52′	7′	22′	37′	52′	7′	22′	
28	0 9.617188	9.619436	9.621675	9.623904	9.626123	9.628332	9.630532	9.632722	9.634902	9.637073	32
29	15 617225	619474	621712	623941	626160	628369	630569	632758	634938	637109	31
30	30 617263	619511	621750	623978	626197	628406	630605	632795	634975	637145	30
31	45 617301	619549	621787	624015	626234	628443	630642	632831	635011	637181	29
	8′	23′	38′	53′	8′	23′	38′	53′	8′	23′	
32	0 9.617338	9.619586	9.621824	9.624052	9.626271	9.628479	9.630678	9.632867	9.635047	9.637217	28
33	15 617375	619623	621861	624089	626308	628516	630715	632904	635083	637253	27
34	30 617413	619661	621899	624126	626345	628553	630751	632940	635120	637289	26
35	45 617451	619698	621936	624163	626382	628590	630788	632977	635156	637325	25
	9′	24′	39′	54′	9′	24′	39′	54′	9′	24′	
36	0 9.617488	9.619736	9.621973	9.624201	9.626418	9.628626	9.630825	9.633013	9.635192	9.637361	24
37	15 617526	619773	622010	624238	626455	628663	630862	633049	635228	637397	23
38	30 617563	619810	622047	624275	626492	628700	630898	633086	635265	637434	22
39	45 617601	619848	622085	624312	626529	628736	630934	633122	635301	637470	21
	10′	25′	40′	55′	10′	25′	40′	55′	10′	25′	
40	0 9.617638	9.619885	9.622122	9.624349	9.626566	9.628773	9.630971	9.633159	9.635337	9.637506	20
41	15 617676	619922	622159	624386	626603	628810	631007	633195	635373	637542	19
42	30 617713	619960	622196	624423	626640	628847	631044	633231	635409	637578	18
43	45 617751	619997	622233	624460	626676	628883	631080	633268	635446	637614	17
	11′	26′	41′	56′	11′	26′	41′	56′	11′	26′	
44	0 9.617788	9.620034	9.622271	9.624497	9.626713	9.628920	9.631117	9.633304	9.635482	9.637650	16
45	15 617826	620072	622308	624534	626750	628957	631153	633341	635518	637686	15
46	30 617863	620109	622345	624571	626787	628993	631190	633377	635554	637722	14
47	45 617901	620146	622382	624608	626824	629030	631226	633413	635590	637758	13
	12′	27′	42′	57′	12′	27′	42′	57′	12′	27′	
48	0 9.617938	9.620184	9.622419	9.624645	9.626861	9.629067	9.631263	9.633450	9.635627	9.637794	12
49	15 617976	620221	622456	624682	626897	629103	631299	633486	635663	637830	11
50	30 618013	620259	622494	624719	626934	629140	631336	633522	635699	637866	10
51	45 618051	620296	622531	624756	626971	629177	631373	633559	635735	637902	9
	13′	28′	43′	58′	13′	28′	43′	58′	13′	28′	
52	0 9.618088	9.620333	9.622568	9.624793	9.627008	9.629213	9.631409	9.633595	9.635771	9.637938	8
53	15 618126	620370	622605	624830	627045	629250	631446	633631	635808	637974	7
54	30 618163	620408	622642	624867	627082	629287	631482	633668	635844	638010	6
55	45 618201	620445	622679	624904	627118	629323	631519	633704	635880	638046	5
	14′	29′	44′	59′	14′	29′	44′	59′	14′	29′	
56	0 9.618238	9.620482	9.622717	9.624941	9.627155	9.629360	9.631555	9.633740	9.635916	9.638082	4
57	15 618276	620520	622754	624978	627192	629397	631592	633777	635952	638118	3
58	30 618313	620557	622791	625015	627229	629433	631628	633813	635989	638154	2
59	45 618351	620594	622828	625052	627266	629470	631665	633849	636025	638190	1
60	60 9.618388	9.620632	9.622865	9.625089	9.627303	9.629507	9.631701	9.633886	9.636061	9.638227	0
sec.	39m	38m	37m	36m	35m	34m	33m	32m	31m	30m	sec.

18 Hours. 18 Hours.

5 Hours.	Log. Haversines.								5 Hours.	
	30m	31m	32m	33m	34m	35m	36m	37m	38m	39m	
	82 deg.		83 deg.				84 deg				
sec.											sec.
	30′	45′	0′	15′	30′	45′	0′	15′	30′	45′	
0	0 9.638227	9.640383	9.642529	9.644666	9.646794	9.648913	9.651022	9.653122	9.655213	9.657294	60
1	15 638263	640418	642565	644702	646829	648948	651057	653157	655247	657329	59
2	30 638299	640454	642601	644737	646865	648983	651092	653192	655282	657363	58
3	45 638335	640490	642636	644773	646900	649018	651127	653227	655317	657398	57
	31′	46′	1′	16′	31′	46′	1′	16′	31′	46′	
4	0 9.638371	9.640526	9.642672	9.644808	9.646936	9.649053	9.651162	9.653261	9.655352	9.657433	56
5	15 638407	640562	642708	644844	646971	649088	651197	653296	655387	657467	55
6	30 638443	640598	642743	644880	647006	649124	651232	653331	655421	657502	54
7	45 638479	640633	642779	644915	647042	649159	651267	653366	655456	657536	53
	32′	47′	2′	17′	32′	47′	2′	17′	32′	47′	
8	0 9.638515	9.640669	9.642815	9.644951	9.647077	9.649194	9.651302	9.653401	9.655491	9.657571	52
9	15 638551	640705	642850	644986	647112	649230	651337	653436	655525	657606	51
10	30 638587	640741	642886	645022	647148	649265	651372	653471	655560	657640	50
11	45 638622	640777	642922	645057	647183	649300	651407	653506	655595	657675	49
	33′	48′	3′	18′	33′	48′	3′	18′	33′	48′	
12	0 9.638658	9.640813	9.642957	9.645093	9.647219	9.649335	9.651443	9.653541	9.655630	9.657709	48
13	15 638694	640848	642993	645128	647254	649370	651478	653575	655664	657744	47
14	30 638730	640884	643029	645164	647289	649406	651513	653610	655699	657779	46
15	45 638766	640920	643064	645199	647325	649441	651548	653645	655734	657813	45
	34′	49′	4′	19′	34′	49′	4′	19′	34′	49′	
16	0 9.638802	9.640956	9.643100	9.645235	9.647360	9.649476	9.651583	9.653680	9.655769	9.657848	44
17	15 638838	640992	643136	645270	647395	649511	651618	653715	655803	657883	43
18	30 638874	641028	643171	645306	647431	649546	651653	653750	655838	657917	42
19	45 638910	641063	643207	645341	647466	649581	651688	653785	655873	657951	41
	35′	50′	5′	20′	35′	50′	5′	20′	35′	50′	
20	0 9.638946	9.641099	9.643243	9.645377	9.647501	9.649617	9.651723	9.653820	9.655907	9.657986	40
21	15 638982	641135	643278	645412	647537	649652	651758	653854	655942	658020	39
22	30 639018	641171	643314	645448	647572	649687	651793	653889	655977	658055	38
23	45 639054	641207	643349	645483	647607	649722	651828	653924	656011	658090	37
	36′	51′	6′	21′	36′	51′	6′	21′	36′	51′	
24	0 9.639090	9.641242	9.643385	9.645519	9.647643	9.649757	9.651863	9.653959	9.656046	9.658124	36
25	15 639126	641278	643421	645554	647678	649792	651898	653994	656081	658159	35
26	30 639162	641314	643456	645590	647713	649828	651933	654029	656116	658193	34
27	45 639198	641350	643492	645625	647749	649863	651968	654064	656150	658228	33
	37′	52′	7′	22′	37′	52′	7′	22′	37′	52′	
28	0 9.639234	9.641385	9.643528	9.645660	9.647784	9.649898	9.652003	9.654099	9.656185	9.658262	32
29	15 639270	641421	643563	645696	647819	649933	652038	654133	656220	658297	31
30	30 639306	641457	643599	645731	647855	649968	652073	654168	656254	658332	30
31	45 639342	641493	643635	645766	647890	650003	652108	654203	656288	658366	29
	38′	53′	8′	23′	38′	53′	8′	23′	38′	53′	
32	0 9.639378	9.641529	9.643670	9.645802	9.647925	9.650039	9.652143	9.654238	9.656324	9.658401	28
33	15 639414	641564	643706	645838	647960	650074	652178	654273	656358	658435	27
34	30 639449	641600	643741	645873	647996	650109	652213	654308	656393	658470	26
35	45 639485	641636	643777	645909	648031	650144	652248	654342	656428	658504	25
	39′	54′	9′	24′	39′	54′	9′	24′	39′	54′	
36	0 9.639521	9.641672	9.643813	9.645944	9.648066	9.650179	9.652283	9.654377	9.656463	9.658539	24
37	15 639557	641707	643848	645980	648101	650214	652318	654412	656497	658573	23
38	30 639593	641743	643884	646015	648137	650249	652353	654447	656532	658608	22
39	45 639629	641779	643919	646050	648172	650285	652388	654482	656567	658642	21
	40′	55′	10′	25′	40′	55′	10′	25′	40′	55′	
40	0 9.639665	9.641815	9.643955	9.646086	9.648207	9.650320	9.652423	9.654517	9.656601	9.658677	20
41	15 639701	641851	643991	646121	648243	650355	652458	654551	656636	658711	19
42	30 639737	641886	644026	646157	648278	650390	652493	654586	656671	658746	18
43	45 639773	641922	644062	646192	648313	650425	652528	654621	656705	658780	17
	41′	56′	11′	26′	41′	56′	11′	26′	41′	56′	
44	0 9.639809	9.641958	9.644097	9.646228	9.648349	9.650460	9.652563	9.654656	9.656740	9.658815	16
45	15 639844	641993	644133	646263	648384	650495	652598	654691	656775	658849	15
46	30 639880	642029	644168	646298	648419	650530	652633	654726	656809	658884	14
47	45 639916	642065	644204	646334	648454	650566	652667	654760	656844	658918	13
	42′	57′	12′	27′	42′	57′	12′	27′	42′	57′	
48	0 9.639952	9.642101	9.644240	9.646369	9.648490	9.650601	9.652702	9.654795	9.656879	9.658953	12
49	15 639988	642136	644275	646405	648525	650636	652737	654830	656913	658987	11
50	30 640024	642172	644311	646440	648560	650671	652772	654865	656948	659022	10
51	45 640060	642208	644346	646476	648595	650706	652807	654899	656982	659056	9
	43′	58′	13′	28′	43′	58′	13′	28′	43′	58′	
52	0 9.640096	9.642243	9.644382	9.646511	9.648631	9.650741	9.652842	9.654934	9.657017	9.659091	8
53	15 640131	642279	644417	646546	648666	650776	652877	654969	657052	659125	7
54	30 640167	642315	644453	646582	648701	650811	652912	655004	657086	659160	6
55	45 640203	642351	644489	646617	648736	650846	652947	655039	657121	659194	5
	44′	59′	14′	29′	44′	59′	14′	29′	44′	59′	
56	0 9.640239	9.642386	9.644524	9.646653	9.648772	9.650881	9.652982	9.655073	9.657156	9.659229	4
57	15 640275	642422	644560	646688	648807	650916	653017	655108	657190	659263	3
58	30 640311	642458	644595	646723	648842	650952	653052	655143	657225	659298	2
59	45 640347	642493	644631	646759	648877	650987	653087	655178	657259	659332	1
60	60 9.640383	9.642529	9.644666	9.646794	9.648913	9.651022	9.653122	9.655213	9.657294	9.659367	0
sec.	29m	28m	27m	26m	25m	24m	23m	22m	21m	20m	sec.

5 Hours. Log. Haversines. 5 Hours.

sec.	40m	41m	42m	43m	44m	45m	46m	47m	48m	49m	sec.
	85 deg.				86 deg.				87 deg.		
	0′	15′	30′	45′	0′	15′	30′	45′	0′	15′	
0	0 9.659367	9.661430	9.663485	9.665530	9.667567	9.669594	9.671613	9.673623	9.675624	9.677617	60
1	15 659401	661464	663519	665564	667601	669628	671647	673657	675658	677650	59
2	30 659436	661499	663553	665598	667634	669662	671680	673690	675691	677683	58
3	45 659470	661533	663587	665632	667668	669695	671714	673723	675724	677716	57
	1′	16′	31′	46′	1′	16′	31′	46′	1′	16′	
4	0 9.659505	9.661567	9.663621	9.665666	9.667702	9.669729	9.671747	9.673757	9.675758	9.677749	56
5	15 659539	661602	663655	665700	667736	669763	671781	673790	675792	677783	55
6	30 659573	661636	663690	665734	667770	669797	671815	673824	675824	677816	54
7	45 659608	661670	663724	665768	667804	669831	671848	673857	675857	677849	53
	2′	17′	32′	47′	2′	17′	32′	47′	2′	17′	
8	0 9.659642	9.661705	9.663758	9.665802	9.667838	9.669864	9.671882	9.673890	9.675891	9.677882	52
9	15 659677	661739	663792	665836	667871	669898	671915	673924	675924	677915	51
10	30 659711	661773	663826	665870	667905	669931	671949	673957	675957	677948	50
11	45 659746	661807	663860	665904	667939	669965	671982	673991	675990	677981	49
	3′	18′	33′	48′	3′	18′	33′	48′	3′	18′	
12	0 9.659780	9.661842	9.663894	9.665938	9.667973	9.669999	9.672016	9.674024	9.676024	9.678014	48
13	15 659814	661876	663928	665972	668007	670033	672049	674057	676057	678047	47
14	30 659849	661910	663963	666006	668041	670066	672083	674091	676090	678081	46
15	45 659883	661945	663997	666040	668075	670100	672116	674124	676123	678114	45
	4′	19′	34′	49′	4′	19′	34′	49′	4′	19′	
16	0 9.659918	9.661979	9.664031	9.666074	9.668108	9.670134	9.672150	9.674158	9.676157	9.678147	44
17	15 659952	662013	664065	666108	668142	670167	672183	674191	676190	678180	43
18	30 659987	662047	664099	666142	668176	670201	672217	674224	676223	678213	42
19	45 660021	662082	664133	666176	668210	670235	672251	674258	676256	678246	41
	5′	20′	35′	50′	5′	20′	35′	50′	5′	20′	
20	0 9.660056	9.662116	9.664167	9.666210	9.668244	9.670268	9.672284	9.674291	9.676290	9.678279	40
21	15 660090	662150	664201	666244	668277	670302	672318	674325	676323	678312	39
22	30 660124	662185	664236	666278	668311	670336	672351	674358	676356	678345	38
23	45 660159	662219	664270	666312	668345	670369	672385	674391	676389	678378	37
	6′	21′	36′	51′	6′	21′	36′	51′	6′	21′	
24	0 9.660193	9.662253	9.664304	9.666346	9.668379	9.670403	9.672418	9.674425	9.676422	9.678412	36
25	15 660227	662287	664338	666380	668413	670437	672452	674458	676456	678445	35
26	30 660262	662322	664372	666414	668446	670470	672485	674491	676489	678478	34
27	45 660296	662356	664406	666448	668480	670504	672519	674525	676522	678511	33
	7′	22′	37′	52′	7′	22′	37′	52′	7′	22′	
28	0 9.660331	9.662390	9.664440	9.666482	9.668514	9.670538	9.672552	9.674558	9.676555	9.678544	32
29	15 660365	662424	664474	666515	668548	670571	672586	674591	676589	678577	31
30	30 660400	662459	664508	666549	668582	670605	672619	674625	676621	678610	30
31	45 660434	662493	664542	666583	668615	670638	672653	674658	676655	678643	29
	8′	23′	38′	53′	8′	23′	38′	53′	8′	23′	
32	0 9.660468	9.662527	9.664577	9.666617	9.668649	9.670672	9.672686	9.674692	9.676688	9.678676	28
33	15 660503	662561	664611	666651	668683	670706	672720	674725	676721	678709	27
34	30 660537	662595	664645	666685	668717	670739	672753	674758	676755	678742	26
35	45 660571	662630	664679	666719	668751	670773	672787	674792	676788	678775	25
	9′	24′	39′	54′	9′	24′	39′	54′	9′	24′	
36	0 9.660606	9.662664	9.664713	9.666753	9.668784	9.670807	9.672820	9.674825	9.676821	9.678808	24
37	15 660640	662698	664747	666787	668818	670840	672854	674858	676854	678841	23
38	30 660675	662732	664781	666821	668852	670874	672887	674892	676887	678874	22
39	45 660709	662767	664815	666855	668886	670908	672921	674925	676921	678907	21
	10′	25′	40′	55′	10′	25′	40′	55′	10′	25′	
40	0 9.660743	9.662801	9.664849	9.666889	9.668919	9.670941	9.672954	9.674958	9.676954	9.678940	20
41	15 660778	662835	664883	666923	668953	670975	672988	674992	676987	678973	19
42	30 660812	662869	664917	666957	668987	671008	673021	675025	677020	679007	18
43	15 660846	662903	664951	666991	669021	671042	673055	675058	677053	679040	17
	11′	26′	41′	56′	11′	26′	41′	56′	11′	26′	
44	0 9.660881	9.662938	9.664986	9.667024	9.669054	9.671076	9.673088	9.675092	9.677086	9.679073	16
45	15 660915	662972	665020	667058	669088	671109	673121	675125	677120	679106	15
46	30 660949	663006	665054	667092	669122	671143	673155	675158	677153	679139	14
47	45 660984	663040	665088	667126	669156	671176	673188	675192	677186	679172	13
	12′	27′	42′	57′	12′	27′	42′	57′	12′	27′	
48	0 9.661018	9.663074	9.665122	9.667160	9.669190	9.671210	9.673222	9.675225	9.677219	9.679205	12
49	15 661052	663109	665156	667194	669223	671244	673255	675258	677252	679238	11
50	30 661087	663143	665190	667228	669257	671277	673289	675291	677285	679271	10
51	45 661121	663177	665224	667262	669291	671311	673322	675325	677319	679304	9
	13′	28′	43′	58′	13′	28′	43′	58′	13′	28′	
52	0 9.661156	9.663211	9.665258	9.667296	9.669324	9.671344	9.673356	9.675358	9.677352	9.679337	8
53	15 661190	663245	665292	667329	669358	671378	673389	675391	677385	679370	7
54	30 661224	663280	665326	667363	669392	671412	673423	675425	677418	679403	6
55	45 661258	663314	665360	667397	669426	671445	673456	675458	677451	679436	5
	14′	29′	44′	59′	14′	29′	44′	59′	14′	29′	
56	0 9.661293	9.663348	9.665394	9.667431	9.669459	9.671479	9.673489	9.675491	9.677484	9.679469	4
57	15 661327	663382	665428	667465	669493	671513	673523	675525	677518	679502	3
58	30 661362	663416	665462	667499	669527	671546	673556	675558	677551	679535	2
59	45 661396	663450	665496	667533	669561	671580	673590	675591	677584	679568	1
60	60 9.661430	9.663485	9.665530	9.667567	9.669594	9.671613	9.673623	9.675624	9.677617	9.679601	0
sec.	19m	18m	17m	16m	15m	14m	13m	12m	11m	10m	sec.

5 Hours.	Log. Haversines.									5 Hours.	
	50m	51m	52m	53m	54m	55m	56m	57m	58m	59m	
	87 deg.		88 deg.				89 deg.				
sec.		30′ 45′	0′ 15′ 30′ 45′				0′ 15′ 30′ 45′				sec.
0	0	9.679601 9.681576	9.683543	9.685501	9.687450	9.689391	9.691324	9.693248	9.695163	9.697071	60
1	15	679634 681609	683575	685533	687482	689423	691356	693280	695195	697103	59
2	30	679667 681642	683608	685566	687515	689456	691388	693312	695227	697134	58
3	45	679700 681674	683641	685598	687547	689488	691420	693344	695259	697166	57
		31′ 46′	1′ 16′ 31′ 46′				1′ 16′ 31′ 46′				
4	0	9.679733 9.681707	9.683673	9.685631	9.687580	9.689520	9.691452	9.693376	9.695291	9.697198	56
5	15	679766 681740	683706	685663	687612	689552	691484	693408	695323	697229	55
6	30	679799 681773	683739	685696	687645	689585	691516	693440	695355	697261	54
7	45	679832 681806	683771	685728	687677	689617	691548	693472	695387	697293	53
		32′ 47′	2′ 17′ 32′ 47′				2′ 17′ 32′ 47′				
8	0	9.679865 9.681839	9.683804	9.685761	9.687709	9.689649	9.691581	9.693504	9.695418	9.697325	52
9	15	679898 681871	683837	685794	687742	689681	691613	693536	695450	697356	51
10	30	679931 681904	683869	685826	687774	689714	691645	693568	695482	697388	50
11	45	679964 681937	683902	685859	687806	689746	691677	693600	695514	697420	49
		33′ 48′	3′ 18′ 33′ 48′				3′ 18′ 33′ 48′				
12	0	9.679997 9.681970	9.683935	9.685891	9.687839	9.689778	9.691709	9.693632	9.695546	9.697451	48
13	15	680029 682003	683967	685924	687871	689810	691741	693663	695577	697483	47
14	30	680062 682036	684000	685956	687904	689843	691773	693695	695609	697515	46
15	45	680095 682068	684033	685989	687936	689875	691805	693727	695641	697546	45
		34′ 49′	4′ 19′ 34′ 49′				4′ 19′ 34′ 49′				
16	0	9.680128 9.682101	9.684066	9.686021	9.687968	9.689907	9.691838	9.693759	9.695673	9.697578	44
17	15	680161 682134	684098	686054	688001	689939	691870	693791	695705	697610	43
18	30	680194 682167	684131	686086	688033	689972	691902	693823	695737	697641	42
19	45	680227 682200	684163	686119	688066	690004	691934	693855	695768	697673	41
		35′ 50′	5′ 20′ 35′ 50′				5′ 20′ 35′ 50′				
20	0	9.680260 9.682232	9.684196	9.686151	9.688098	9.690036	9.691966	9.693887	9.695800	9.697705	40
21	15	680293 682265	684229	686184	688130	690068	691998	693919	695832	697736	39
22	30	680326 682298	684261	686216	688163	690101	692030	693951	695864	697768	38
23	45	680359 682331	684294	686249	688195	690133	692062	693983	695896	697800	37
		36′ 51′	6′ 21′ 36′ 51′				6′ 21′ 36′ 51′				
24	0	9.680392 9.682364	9.684327	9.686281	9.688227	9.690165	9.692094	9.694015	9.695927	9.697832	36
25	15	680425 682396	684359	686314	688260	690197	692126	694047	695959	697863	35
26	30	680458 682429	684392	686346	688292	690230	692158	694079	695991	697895	34
27	45	680491 682462	684425	686379	688325	690262	692190	694111	696023	697926	33
		37′ 52′	7′ 22′ 37′ 52′				7′ 22′ 37′ 52′				
28	0	9.680524 9.682495	9.684457	9.686411	9.688357	9.690294	9.692223	9.694143	9.696055	9.697958	32
29	15	680557 682528	684490	686444	688389	690326	692255	694175	696086	697990	31
30	30	680589 682560	684523	686476	688422	690358	692287	694207	696118	698021	30
31	45	680622 682593	684555	686509	688454	690391	692319	694239	696150	698053	29
		38′ 53′	8′ 23′ 38′ 53′				8′ 23′ 38′ 53′				
32	0	9.680655 9.682626	9.684588	9.686541	9.688486	9.690423	9.692351	9.694271	9.696182	9.698085	28
33	15	680688 682659	684620	686574	688519	690455	692383	694302	696214	698116	27
34	30	680721 682691	684653	686606	688551	690487	692415	694334	696245	698148	26
35	45	680754 682724	684686	686639	688583	690519	692447	694366	696277	698180	25
		39′ 54′	9′ 24′ 39′ 54′				9′ 24′ 39′ 54′				
36	0	9.680787 9.682757	9.684718	9.686671	9.688616	9.690552	9.692479	9.694398	9.696309	9.698211	24
37	15	680820 682790	684751	686704	688648	690584	692511	694430	696341	698243	23
38	30	680853 682822	684784	686736	688680	690616	692543	694462	696372	698275	22
39	45	680886 682855	684816	686769	688713	690648	692575	694494	696404	698306	21
		40′ 55′	10′ 25′ 40′ 55′				10′ 25′ 40′ 55′				
40	0	9.680919 9.682888	9.684849	9.686801	9.688745	9.690680	9.692607	9.694526	9.696436	9.698338	20
41	15	680951 682921	684882	686834	688777	690712	692639	694558	696468	698369	19
42	30	680984 682953	684914	686866	688810	690745	692671	694590	696500	698401	18
43	45	681017 682986	684947	686899	688843	690777	692703	694622	696531	698433	17
		41′ 56′	11′ 26′ 41′ 56′				11′ 26′ 41′ 56′				
44	0	9.681050 9.683019	9.684979	9.686931	9.688874	9.690809	9.692735	9.694653	9.696563	9.698464	16
45	15	681083 683052	685012	686963	688907	690841	692767	694685	696595	698496	15
46	30	681116 683084	685044	686996	688939	690873	692800	694717	696627	698528	14
47	45	681149 683117	685077	687028	688971	690906	692831	694749	696658	698559	13
		42′ 57′	12′ 27′ 42′ 57′				12′ 27′ 42′ 57′				
48	0	9.681182 9.683150	9.685110	9.687061	9.689004	9.690938	9.692864	9.694781	9.696690	9.698591	12
49	15	681214 683183	685142	687093	689036	690970	692896	694813	696722	698622	11
50	30	681247 683215	685175	687126	689068	691002	692926	694845	696754	698654	10
51	45	681280 683248	685207	687158	689100	691034	692960	694877	696785	698686	9
		43′ 58′	13′ 28′ 43′ 58′				13′ 28′ 43′ 58′				
52	0	9.681313 9.683281	9.685240	9.687191	9.689133	9.691066	9.692992	9.694909	9.696817	9.698717	8
53	15	681346 683314	685273	687223	689165	691099	693024	694940	696849	698749	7
54	30	681379 683346	685305	687255	689197	691131	693056	694972	696881	698780	6
55	45	681412 683379	685338	687289	689230	691163	693088	695004	696912	698812	5
		44′ 59′	14′ 29′ 44′ 59′				14′ 29′ 44′ 59′				
56	0	9.681445 9.683412	9.685370	9.687320	9.689262	9.691195	9.693120	9.695036	9.696944	9.698844	4
57	15	681477 683444	685403	687353	689294	691227	693152	695068	696976	698875	3
58	30	681510 683477	685435	687385	689326	691259	693184	695100	697007	698907	2
59	45	681543 683510	685468	687418	689359	691291	693216	695132	697039	698938	1
60	60	9.681576 9.683543	9.685501	9.687450	9.689391	9.691324	9.693248	9.695163	9.697071	9.698970	0
sec.		9m 8m	7m	6m	5m	4m	3m	2m	1m	0m	sec.

6 Hours.	Log. Haversines.									6 Hours.	
	0m	1m	2m	3m	4m	5m	6m	7m	8m	9m	
	90 deg.				91 deg.				92 deg.		
sec.	″ 0′	15′	30′	45′	0′	15′	30′	45′	0′	15′	sec.
0	0 9.698970	9.700860	9.702743	9.704618	9.706484	9.708342	9.710192	9.712034	9.713868	9.715694	60
1	15 699001	700892	702775	704649	706515	708373	710223	712065	713899	715724	59
2	30 699033	700924	702806	704680	706546	708404	710254	712095	713929	715755	58
3	45 699065	700955	702837	704711	706577	708435	710284	712126	713960	715785	57
	1′	16′	31′	46′	1′	16′	31′	46′	1′	16	
4	0 9.699096	9.700987	9.702869	9.704743	9.706608	9.708466	9.710315	9.712157	9.713990	9.715816	56
5	15 699128	701018	702900	704774	706639	708497	710346	712187	714021	715846	55
6	30 699159	701049	702931	704805	706670	708528	710377	712218	714051	715676	54
7	45 699191	701081	702962	704836	706701	708558	710408	712249	714082	715907	53
	2′	17′	32′	47′	2′	17′	32′	47′	2′	17′	
8	0 9.699223	9.701112	9.702994	9.704867	9.706732	9.708589	9.710438	9.712279	9.714112	9.715937	52
9	15 699254	701144	703025	704898	706763	708620	710469	712310	714143	715967	51
10	30 699286	701175	703056	704929	706794	708651	710500	712340	714173	715998	50
11	45 699317	701207	703087	704961	706825	708682	710531	712371	714204	716028	49
	3′	18′	33′	48′	3′	18′	33′	48′	3′	18′	
12	0 9.699349	9.701238	9.703119	9.704992	9.706856	9.708713	9.710561	9.712402	9.714234	9.716058	48
13	15 699380	701269	703150	705023	706887	708744	710592	712432	714264	716089	47
14	30 699412	701301	703182	705054	706918	708775	710623	712463	714295	716119	46
15	45 699443	701332	703213	705085	706949	708805	710653	712493	714325	716149	45
	4′	19′	34′	49′	4′	19′	34′	49′	4′	19′	
16	0 9.699475	9.701364	9.703244	9.705116	9.706980	9.708836	9.710684	9.712524	9.714356	9.716180	44
17	15 699506	701395	703275	705147	707011	708867	710715	712555	714386	716210	43
18	30 699538	701426	703307	705179	707042	708898	710746	712585	714417	716240	42
19	45 699569	701458	703338	705210	707073	708929	710776	712616	714447	716271	41
	5′	20′	35′	50′	5′	20′	35′	50′	5′	20′	
20	0 9.699601	9.701489	9.703369	9.705241	9.707104	9.708960	9.710807	9.712646	9.714478	9.716301	40
21	15 699633	701521	703400	705272	707135	708991	710838	712676	714508	716331	39
22	30 699664	701552	703432	705303	707166	709022	710869	712708	714539	716362	38
23	45 699696	701583	703463	705334	707197	709052	710899	712738	714569	716392	37
	6′	21′	36′	51′	6′	21′	36′	51′	6′	21′	
24	0 9.699727	9.701615	9.703494	9.705365	9.707228	9.709083	9.710930	9.712769	9.714600	9.716422	36
25	15 699759	701646	703525	705396	707259	709114	710961	712799	714630	716453	35
26	30 699790	701678	703557	705428	707290	709145	710991	712830	714660	716483	34
27	45 699822	701709	703588	705459	707321	709176	711022	712860	714691	716513	33
	7′	22′	37′	52′	7′	22′	37′	52′	7′	22′	
28	0 9.699853	9.701740	9.703619	9.705490	9.707352	9.709207	9.711053	9.712891	9.714721	9.716544	32
29	15 699885	701772	703650	705521	707383	709237	711084	712922	714752	716574	31
30	30 699916	701803	703682	705552	707414	709268	711114	712952	714782	716604	30
31	45 699948	701834	703713	705583	707445	709299	711145	712983	714813	716634	29
	8′	23′	38′	53′	8′	23′	38′	53′	8′	23′	
32	0 9.699979	9.701866	9.703744	9.705614	9.707476	9.709330	9.711176	9.713013	9.714843	9.716665	28
33	15 700011	701897	703775	705645	707507	709361	711206	713044	714873	716695	27
34	30 700042	701929	703807	705676	707538	709392	711237	713074	714904	716725	26
35	45 700074	701960	703838	705707	707569	709422	711268	713105	714934	716756	25
	9′	24′	39′	54′	9′	24′	39′	54′	9′	24′	
36	0 9.700105	9.701991	9.703869	9.705739	9.707600	9.709453	9.711298	9.713136	9.714965	9.716786	24
37	15 700137	702023	703900	705770	707631	709484	711329	713166	714995	716816	23
38	30 700168	702054	703932	705801	707662	709515	711360	713197	715026	716846	22
39	45 700200	702085	703963	705832	707593	709546	711391	713227	715056	716877	21
	10′	25′	40′	55′	10′	25′	40′	55′	10′	25′	
40	0 9.700231	9.702117	9.703994	9.705863	9.707724	9.709576	9.711421	9.713258	9.715086	9.716907	20
41	15 700263	702148	704025	705894	707755	709607	711452	713288	715117	716937	19
42	30 700294	702180	704056	705925	707786	709638	711482	713319	715147	716968	18
43	45 700326	702211	704087	705956	707817	709669	711513	713349	715178	716998	17
	11′	26′	41′	56′	11′	26′	41′	56′	11′	26′	
44	0 9.700357	9.702242	9.704119	9.705987	9.707848	9.709700	9.711544	9.713380	9.715208	9.717028	16
45	15 700389	702273	704150	706018	707878	709730	711574	713410	715238	717058	15
46	30 700420	702305	704181	706049	707909	709761	711605	713441	715269	717089	14
47	45 700452	702336	704212	706080	707940	709792	711636	713471	715299	717119	13
	12′	27′	42′	57′	12′	27′	42′	57′	12′	27′	
48	0 9.700483	9.702368	9.704244	9.706112	9.707971	9.709823	9.711666	9.713502	9.715330	9.717149	12
49	15 700515	702399	704275	706143	708002	709854	711697	713533	715360	717179	11
50	30 700546	702430	704306	706174	708033	709884	711728	713563	715390	717210	10
51	45 700578	702461	704337	706205	708064	709915	711758	713594	715421	717240	9
	13′	28′	43′	58′	13′	28′	43′	58′	13′	28′	
52	0 9.700609	9.702493	9.704368	9.706236	9.708095	9.709946	9.711789	9.713624	9.715451	9.717270	8
53	15 700641	702524	704399	706267	708126	709977	711820	713655	715481	717300	7
54	30 700672	702556	704431	706298	708157	710008	711850	713685	715512	717331	6
55	45 700703	702587	704462	706329	708188	710038	711881	713716	715542	717361	5
	14′	29′	44′	59′	14′	29′	44′	59′	14′	29′	
56	0 9.700735	9.702618	9.704493	9.706360	9.708219	9.710069	9.711912	9.713746	9.715575	9.717391	4
57	15 700766	702649	704524	706391	708249	710100	711942	713777	715603	717421	3
58	30 700798	702681	704556	706422	708280	710131	711973	713807	715633	717452	2
59	45 700829	702712	704587	706453	708311	710161	712004	713838	715664	717482	1
60	60 9.700860	9.702743	9.704618	9.706484	9.708342	9.710192	9.712034	9.713868	9.715694	9.717512	0
sec.	59m	58m	57m	56m	55m	54m	53m	52m	51m	50m	sec.

6 Hours. Log. Haversines. 6 Hours.

sec.	10m	11m	12m	13m	14m	15m	16m	17m	18m	19m	sec.
	92 deg.		93 deg.				94 deg.				
	0′	15′	0′	15′	30′	45′	0′	15′	30′	45′	
0	9.717512	9.719322	9.721124	9.722919	9.724705	9.726484	9.728255	9.730018	9.731773	9.733520	60
1	15 717542	719350	721154	722949	724735	726513	728284	730047	731803	733551	59
2	30 717573	719379	721184	722979	724765	726543	728314	730077	731832	733581	58
3	45 717603	719413	721214	723009	724794	726573	728343	730106	731861	733609	57
	1′	16′	1′	16′	31′	46′	1′	16′	31′	46′	
4	9.717634	9.719443	9.721244	9.723038	9.724824	9.726602	9.728373	9.730135	9.731890	9.733638	56
5	15 717663	719473	721274	723068	724854	726632	728402	730165	731920	733667	55
6	30 717694	719503	721304	723098	724883	726661	728432	730194	731949	733696	54
7	45 717724	719533	721334	723128	724913	726691	728461	730223	731978	733725	53
	2′	17′	2′	17′	32′	47′	2′	17′	32′	47′	
8	9.717754	9.719563	9.721364	9.723157	9.724943	9.726721	9.728490	9.730253	9.732007	9.733754	52
9	15 717784	719593	721394	723187	724973	726750	728520	730282	732036	733783	51
10	30 717814	719623	721424	723217	725002	726780	728549	730311	732066	733812	50
11	45 717845	719653	721454	723247	725032	726809	728579	730341	732095	733841	49
	3′	18′	3′	18′	33′	48′	3′	18′	33′	48′	
12	9.717875	9.719683	9.721484	9.723277	9.725062	9.726839	9.728608	9.730370	9.732124	9.733870	48
13	15 717905	719713	721514	723306	725091	726868	728638	730399	732153	733899	47
14	30 717935	719743	721544	723336	725121	726898	728667	730428	732182	733928	46
15	45 717965	719773	721574	723366	725151	726927	728696	730458	732211	733957	45
	4′	19′	4′	19′	34′	49′	4′	19′	34′	49′	
16	9.717996	9.719804	9.721604	9.723396	9.725180	9.726957	9.728726	9.730487	9.732241	9.733986	44
17	15 718026	719834	721634	723426	725210	726986	728755	730516	732270	734015	43
18	30 718056	719864	721664	723456	725240	727016	728785	730546	732299	734044	42
19	45 718086	719894	721693	723485	725269	727046	728814	730575	732328	734073	41
	5′	20′	5′	20′	35′	50′	5′	20′	35′	50′	
20	9.718116	9.719924	9.721723	9.723515	9.725299	9.727075	9.728844	9.730604	9.732357	9.734102	40
21	15 718147	719954	721753	723545	725329	727105	728873	730633	732386	734131	39
22	30 718177	719984	721783	723575	725358	727134	728902	730663	732415	734161	38
23	45 718207	720014	721813	723604	725388	727164	728932	730692	732445	734189	37
	6′	21′	6′	21′	36′	51′	6′	21′	36′	51′	
24	9.718237	9.720044	9.721843	9.723634	9.725418	9.727193	9.728961	9.730721	9.732474	9.734219	36
25	15 718267	720074	721873	723664	725447	727223	728991	730751	732503	734247	35
26	30 718297	720104	721903	723694	725477	727252	729020	730780	732532	734277	34
27	45 718328	720134	721933	723724	725507	727282	729049	730809	732561	734306	33
	7′	22′	7′	22′	37′	52′	7′	22′	37′	52′	
28	9.718358	9.720164	9.721963	9.723753	9.725536	9.727311	9.729079	9.730838	9.732590	9.734335	32
29	15 718388	720194	721993	723783	725566	727341	729108	730868	732619	734364	31
30	30 718418	720224	722023	723813	725596	727370	729138	730897	732649	734393	30
31	45 718448	720254	722052	723843	725625	727400	729167	730926	732678	734422	29
	8′	23′	8′	23′	38′	53′	8′	23′	38′	53′	
32	9.718479	9.720281	9.722082	9.723873	9.725655	9.727429	9.729196	9.730955	9.732707	9.734451	28
33	15 718509	720314	722112	723902	725684	727459	729226	730985	732736	734480	27
34	30 718539	720344	722142	723932	725714	727488	729255	731014	732765	734509	26
35	45 718569	720374	722172	723962	725744	727518	729284	731043	732794	734538	25
	9′	24′	9′	24′	39′	54′	9′	24′	39′	54′	
36	9.718599	9.720404	9.722202	9.723992	9.725773	9.727547	9.729314	9.731072	9.732823	9.734567	24
37	15 718629	720435	722232	724021	725803	727577	729343	731102	732852	734596	23
38	30 718659	720465	722262	724051	725833	727606	729373	731131	732882	734625	22
39	45 718689	720495	722292	724081	725862	727636	729402	731160	732911	734653	21
	10′	25′	10′	25′	40′	55′	10′	25′	40′	55′	
40	9.718720	9.720525	9.722322	9.724111	9.725892	9.727665	9.729431	9.731189	9.732940	9.734683	20
41	15 718750	720555	722351	724140	725922	727695	729461	731219	732969	734711	19
42	30 718780	720585	722381	724170	725951	727724	729490	731248	732998	734741	18
43	45 718810	720615	722411	724200	725981	727754	729519	731277	733027	734769	17
	11′	26′	11′	26′	41′	56′	11′	26′	41′	56′	
44	9.718840	9.720645	9.722441	9.724230	9.726010	9.727783	9.729549	9.731306	9.733056	9.734798	16
45	15 718870	720675	722471	724259	726040	727813	729578	731335	733085	734827	15
46	30 718901	720705	722501	724289	726070	727842	729607	731365	733114	734856	14
47	45 718931	720735	722531	724319	726099	727872	729637	731394	733143	734885	13
	12′	27′	12′	27′	42′	57′	12′	27′	42′	57′	
48	9.718961	9.720765	9.722561	9.724349	9.726129	9.727901	9.729666	9.731423	9.733173	9.734914	12
49	15 718991	720795	722590	724378	726158	727931	729695	731452	733202	734943	11
50	30 719021	720825	722620	724408	726188	727960	729725	731482	733231	734972	10
51	45 719051	720855	722650	724438	726218	727990	729754	731511	733260	735001	9
	13′	28′	13′	28′	43′	58′	13′	28′	43′	58′	
52	9.719081	9.720885	9.722680	9.724468	9.726247	9.728019	9.729784	9.731540	9.733289	9.735030	8
53	15 719111	720915	722710	724497	726276	728049	729813	731569	733318	735059	7
54	30 719142	720945	722740	724527	726306	728078	729842	731598	733347	735088	6
55	45 719172	720975	722770	724557	726336	728108	729871	731628	733376	735117	5
	14′	29′	14′	29′	44′	59′	14′	29′	44′	59′	
56	9.719202	9.721005	9.722799	9.724586	9.726366	9.728137	9.729901	9.731657	9.733405	9.735146	4
57	15 719232	721034	722829	724616	726395	728167	729930	731686	733434	735175	3
58	30 719262	721064	722859	724646	726425	728196	729960	731715	733463	735204	2
59	45 719292	721094	722889	724676	726454	728225	729989	731744	733492	735233	1
60	60 9.719322	9.721124	9.722919	9.724705	9.726484	9.728255	9.730018	9.731773	9.733520	9.735262	0
sec.	49m	48m	47m	46m	45m	44m	43m	42m	41m	40m	sec.

17 Hours. 17 Hours.

6 Hours.	Log. Haversines.	6 Hours.

sec.	20m	21m	22m	23m	24m	25m	26m	27m	28m	29m	sec.
	95 deg.				96 deg.				97 deg.		
	′ 0′	15′	30′	45′	0′	15′	30′	45′	0′	15′	
0	0 9.735262	9.736994	9.738719	9.740437	9.742147	9.743849	9.745544	9.747232	9.748912	9.750585	60
1	15 735291	737023	738748	740465	742175	743878	745573	747260	748940	750613	59
2	30 735320	737052	738777	740494	742204	743906	745601	747288	748968	750641	58
3	45 735349	737081	738805	740523	742232	743934	745629	747316	748996	750669	57
	1′	16′	31′	46′	1′	16′	31′	46′	1′	16′	
4	0 9.735378	9.737110	9.738834	9.740551	9.742261	9.743963	9.745657	9.747344	9.749024	9.750696	56
5	15 735407	737139	738863	740580	742289	743991	745685	747372	749052	750724	55
6	30 735435	737167	738892	740608	742318	744019	745714	747400	749080	750752	54
7	45 735464	737196	738920	740637	742346	744047	745742	747428	749108	750780	53
	2′	17′	32′	47′	2′	17′	32′	47′	2′	17′	
8	0 9.735493	9.737225	9.738949	9.740665	9.742374	9.744076	9.745770	9.747457	9.749136	9.750808	52
9	15 735522	737254	738977	740694	742403	744104	745798	747485	749164	750835	51
10	30 735551	737282	739006	740722	742431	744132	745826	747513	749192	750863	50
11	45 735580	737311	739035	740751	742459	744161	745854	747541	749219	750891	49
	3′	18′	33′	48′	3′	18′	33′	48′	3′	18′	
12	0 9.735609	9.737340	9.739064	9.740780	9.742488	9.744189	9.745883	9.747569	9.749247	9.750919	48
13	15 735638	737379	739092	740808	742516	744217	745911	747597	749275	750947	47
14	30 735667	737398	739121	740837	742545	744246	745939	747625	749303	750974	46
15	45 735696	737426	739149	740865	742573	744274	745967	747653	749331	751002	45
	4′	19′	34′	49′	4′	19′	34′	49′	4′	19′	
16	0 9.735725	9.737455	9.739178	9.740894	9.742602	9.744302	9.745995	9.747681	9.749359	9.751030	44
17	15 735753	737484	739207	740922	742630	744330	746023	747709	749387	751058	43
18	30 735782	737513	739235	740951	742658	744359	746052	747737	749415	751086	42
19	45 735811	737541	739264	740979	742687	744387	746080	747765	749443	751113	41
	5′	20′	35′	50′	5′	20′	35′	50′	5′	20′	
20	0 9.735840	9.737570	9.739293	9.741008	9.742715	9.744415	9.746108	9.747793	9.749471	9.751141	40
21	15 735869	737599	739321	741036	742744	744443	746136	747821	749499	751169	39
22	30 735898	737628	739350	741065	742772	744472	746164	747849	749527	751197	38
23	45 735927	737656	739379	741093	742800	744500	746192	747877	749554	751224	37
	6′	21′	36′	51′	6′	21′	36′	51′	6′	21′	
24	0 9.735956	9.737685	9.739407	9.741122	9.742829	9.744528	9.746220	9.747905	9.749582	9.751252	36
25	15 735985	737714	739436	741150	742857	744557	746248	747933	749610	751280	35
26	30 736014	737743	739465	741179	742886	744585	746277	747961	749638	751308	34
27	45 736042	737772	739493	741207	742914	744613	746305	747989	749666	751335	33
	7′	22′	37′	52′	7′	22′	37′	52′	7′	22′	
28	0 9.736071	9.737800	9.739522	9.741236	9.742942	9.744641	9.746333	9.748017	9.749694	9.751363	32
29	15 736100	737829	739551	741264	742971	744669	746361	748045	749722	751391	31
30	30 736129	737858	739579	741293	742999	744698	746389	748073	749750	751419	30
31	45 736158	737887	739608	741321	743027	744726	746417	748101	749777	751447	29
	8′	23′	38′	53′	8′	23′	38′	53′	8′	23′	
32	0 9.736187	9.737915	9.739636	9.741350	9.743056	9.744754	9.746445	9.748129	9.749805	9.751474	28
33	15 736216	737944	739665	741378	743084	744783	746473	748157	749833	751502	27
34	30 736245	737973	739694	741407	743113	744811	746502	748185	749861	751530	26
35	45 736273	738001	739722	741435	743141	744839	746530	748213	749889	751558	25
	9′	24′	39′	54′	9′	24′	39′	54′	9′	24′	
36	0 9.736302	9.738030	9.739751	9.741464	9.743169	9.744867	9.746558	9.748241	9.749917	9.751585	24
37	15 736331	738059	739779	741492	743198	744895	746586	748269	749945	751613	23
38	30 736360	738088	739808	741521	743226	744924	746614	748297	749973	751641	22
39	45 736389	738116	739837	741549	743254	744952	746642	748325	750000	751668	21
	10′	25′	40′	55′	10′	25′	40′	55′	10′	25′	
40	0 9.736418	9.738145	9.739865	9.741578	9.743283	9.744980	9.746670	9.748353	9.750028	9.751696	20
41	15 736446	738174	739894	741606	743311	745008	746698	748381	750056	751724	19
42	30 736475	738203	739922	741635	743339	745037	746727	748409	750084	751752	18
43	45 736504	738231	739951	741663	743368	745065	746755	748437	750112	751779	17
	11′	26′	41′	56′	11′	26′	41′	56′	11′	26′	
44	0 9.736533	9.738260	9.739980	9.741692	9.743396	9.745093	9.746783	9.748465	9.750140	9.751807	16
45	15 736562	738289	740008	741720	743424	745121	746811	748493	750168	751835	15
46	30 736591	738318	740037	741749	743453	745150	746839	748521	750195	751863	14
47	45 736620	738346	740065	741777	743481	745178	746867	748549	750223	751890	13
	12′	27′	42′	57′	12′	27′	42′	57′	12′	27′	
48	0 9.736648	9.738375	9.740094	9.741806	9.743510	9.745206	9.746895	9.748577	9.750251	9.751918	12
49	15 736677	738404	740123	741834	743538	745234	746923	748605	750279	751946	11
50	30 736706	738432	740151	741862	743566	745262	746951	748633	750307	751974	10
51	45 736735	738461	740180	741891	743595	745291	746979	748661	750335	752001	9
	13′	28′	43′	58′	13′	28′	43′	58′	13′	28′	
52	0 9.736764	9.738490	9.740208	9.741919	9.743623	9.745319	9.747007	9.748689	9.750363	9.752029	8
53	15 736793	738518	740237	741948	743651	745347	747035	748717	750390	752057	7
54	30 736821	738547	740266	741976	743680	745375	747064	748745	750418	752084	6
55	45 736850	738576	740294	742005	743708	745403	747092	748773	750446	752112	5
	14′	29′	44′	59′	14′	29′	44′	59′	14′	29′	
56	0 9.736879	9.738605	9.740323	9.742033	9.743736	9.745432	9.747120	9.748801	9.750474	9.752140	4
57	15 736908	738633	740351	742061	743764	745460	747148	748828	750502	752167	3
58	30 736937	738662	740380	742090	743793	745488	747176	748856	750529	752195	2
59	45 736965	738691	740408	742118	743821	745516	747204	748884	750557	752223	1
60	60 9.736994	9 738719	9.740437	9.742147	9.743849	9.745544	9.747232	9 748912	9.750585	9.752251	0
sec.	39m	38m	37m	36m	35m	34m	33m	32m	31m	30m	sec.

6 Hours.	Log. Haversines.									6 Hours.
	30m	31m	32m	33m	34m	35m	36m	37m	38m	39m
sec.	97 deg.		98 deg.				99 deg.			sec.
	30′	45′	0′	15′	30′	45′	0′	15′	30′	45′	
0	0 9.752261	9.753909	9.755560	9.757203	9.758840	9.760469	9.762091	9.763706	9.765314	9.766914	60
1	15 752278	753936	755587	757231	758867	760496	762118	763733	765341	766941	59
2	30 752306	753964	755615	757258	758894	760523	762145	763760	765367	766968	58
3	45 752333	753992	755642	757285	758921	760550	762172	763786	765394	766995	57
	31′	46′	1′	16′	31′	46′	1′	16′	31′	46′	
4	0 9.752361	9.754019	9.755670	9.757313	9.758949	9.760577	9.762199	9.763813	9.765421	9.767021	56
5	15 752389	754047	755697	757340	758976	760604	762226	763840	765447	767047	55
6	30 752417	754074	755724	757367	759003	760632	762253	763867	765474	767074	54
7	45 752444	754102	755752	757395	759030	760659	762280	763894	765501	767101	53
	32′	47′	2′	17′	32′	47′	2′	17′	32′	47′	
8	0 9.752472	9.754129	9.755779	9.757422	9.759057	9.760686	9.762307	9.763921	9.765528	9.767127	52
9	15 752500	754157	755807	757449	759085	760713	762334	763948	765554	767154	51
10	30 752528	754184	755834	757477	759112	760740	762361	763974	765581	767180	50
11	45 752555	754212	755862	757504	759139	760767	762388	764001	765608	767207	49
	33′	48′	3′	18′	33′	48′	3′	18′	33′	48′	
12	0 9.752583	9.754239	9.755889	9.757531	9.759166	9.760794	9.762415	9.764028	9.765634	9.767234	48
13	15 752610	754267	755916	757559	759193	760821	762442	764055	765661	767260	47
14	30 752638	754295	755944	757586	759221	760848	762468	764082	765688	767287	46
15	45 752676	754322	755971	757613	759248	760875	762495	764109	765714	767313	45
	34′	49′	4′	19′	34′	49′	4′	19′	34′	49′	
16	0 9.752694	9.754350	9.755999	9.757640	9.759275	9.760902	9.762522	9.764135	9.765741	9.767340	44
17	15 752721	754377	756026	757668	759302	760929	762549	764162	765768	767367	43
18	30 752749	754405	756054	757695	759329	760956	762576	764189	765795	767393	42
19	45 752776	754432	756081	757722	759356	760983	762603	764216	765821	767420	41
	35′	50′	5′	20′	35′	50′	5′	20′	35′	50′	
20	0 9.752804	9.754460	9.756108	9.757750	9.759384	9.761010	9.762630	9.764243	9.765848	9.767446	40
21	15 752832	754487	756136	757777	759411	761038	762657	764269	765875	767473	39
22	30 752859	754515	756163	757804	759438	761065	762684	764296	765901	767499	38
23	45 752887	754542	756191	757831	759465	761092	762711	764323	765928	767526	37
	36′	51′	6′	21′	36′	51′	6′	21′	36′	51′	
24	0 9.752915	9.754570	9.756218	9.757859	9.759492	9.761119	9.762738	9.764350	9.765955	9.767553	36
25	15 752942	754597	756245	757886	759519	761146	762765	764377	765981	767579	35
26	30 752970	754625	756273	757913	759547	761173	762792	764403	766008	767606	34
27	45 752998	754653	756300	757941	759574	761200	762819	764430	766035	767632	33
	37′	52′	7′	22′	37′	52′	7′	22′	37′	52′	
28	0 9.753025	9.754680	9.756328	9.757968	9.759601	9.761227	9.762846	9.764457	9.766062	9.767659	32
29	15 753053	754708	756355	757995	759628	761254	762872	764484	766088	767685	31
30	30 753081	754735	756382	758022	759655	761281	762899	764511	766115	767712	30
31	45 753108	754763	756410	758050	759682	761308	762926	764537	766142	767739	29
	38′	53′	8′	23′	38′	53′	8′	23′	38′	53′	
32	0 9.753136	9.754790	9.756437	9.758077	9.759710	9.761335	9.762953	9.764564	9.766168	9.767765	28
33	15 753163	754818	756465	758104	759737	761362	762980	764591	766195	767792	27
34	30 753191	754845	756492	758132	759764	761389	763007	764618	766222	767818	26
35	45 753219	754873	756519	758159	759791	761416	763034	764645	766248	767845	25
	39′	54′	9′	24′	39′	54′	9′	24′	39′	54′	
36	0 9.753246	9.754900	9.756547	9.758186	9.759818	9.761443	9.763061	9.764671	9.766275	9.767871	24
37	15 753274	754928	756574	758213	759845	761470	763088	764698	766302	767898	23
38	30 753302	754955	756602	758241	759872	761497	763115	764724	766328	767924	22
39	45 753329	754983	756629	758268	759899	761524	763142	764751	766355	767951	21
	40′	55′	10′	25′	40′	55′	10′	25′	40′	55′	
40	0 9.753357	9.755010	9.756656	9.758295	9.759927	9.761551	9.763168	9.764779	9.766382	9.767978	20
41	15 753384	755038	756684	758322	759954	761578	763195	764805	766408	768004	19
42	30 753412	755065	756711	758350	759981	761605	763222	764832	766435	768031	18
43	45 753440	755093	756738	758377	760008	761632	763249	764859	766462	768057	17
	41′	56′	11′	26′	41′	56′	11′	26′	41′	56′	
44	0 9.753467	9.755120	9.756766	9.758404	9.760035	9.761659	9.763276	9.764886	9.766488	9.768084	16
45	15 753495	755148	756793	758431	760062	761686	763303	764912	766515	768110	15
46	30 753523	755175	756821	758459	760089	761713	763330	764939	766541	768137	14
47	45 753550	755203	756848	758487	760117	761740	763357	764966	766568	768163	13
	42′	57′	12′	27′	42′	57′	12′	27′	42′	57′	
48	0 9.753578	9.755230	9.756875	9.758513	9.760144	9.761767	9.763384	9.764993	9.766595	9.768190	12
49	15 753605	755258	756903	758540	760171	761794	763410	765019	766621	768216	11
50	30 753633	755285	756930	758568	760198	761821	763437	765046	766648	768243	10
51	45 753661	755313	756957	758595	760225	761848	763464	765073	766675	768269	9
	43′	58′	13′	28′	43′	58′	13′	28′	43′	58′	
52	0 9.753688	9.755340	9.756985	9.758622	9.760252	9.761875	9.763491	9.765100	9.766701	9.768296	8
53	15 753716	755367	757012	758649	760279	761902	763518	765126	766728	768322	7
54	30 753743	755395	757039	758676	760306	761929	763545	765153	766755	768349	6
55	45 753771	755422	757067	758704	760333	761956	763572	765180	766781	768375	5
	44′	59′	14′	29′	44′	59′	14′	29′	44′	59′	
56	0 9.753799	9.755450	9.757094	9.758731	9.760361	9.761983	9.763598	9.765207	9.766808	9.768402	4
57	15 753826	755477	757121	758758	760388	762010	763625	765233	766835	768428	3
58	30 753854	755505	757149	758785	760415	762037	763652	765260	766861	768455	2
59	45 753881	755532	757176	758813	760442	762064	763679	765287	766888	768481	1
60	60 9.753909	9.755560	9.757203	9.758840	9.760469	9.762091	9.763706	9.765314	9.766914	9.768508	0
sec.	29m	28m	27m	26m	25m	24m	23m	22m	21m	20m	sec.

17 Hours. 17 Hours.

6 Hours. Log. Haversines. 6 Hours.

sec.	m	40m	41m	42m	43m	44m	45m	46m	47m	48m	49m	sec.
		100 deg.				101 deg.				102 deg.		
		0′	15′	30′	45′	0′	15′	30′	45′	0′	15′	
0	0	9.768508	9.770094	9.771674	9.773247	9.774812	9.776371	9.777922	9.779467	9.781005	9.782536	60
1	15	768534	770121	771700	773273	774838	776397	777948	779493	781031	782562	59
2	30	768561	770147	771727	773299	774864	776423	777974	779519	781056	782587	58
3	45	768587	770174	771753	773325	774890	776448	778000	779544	781082	782613	57
		1′	16′	31′	46′	1′	16′	31′	46′	1′	16′	
4	0	9.768614	9.770200	9.771779	9.773351	9.774916	9.776474	9.778026	9.779570	9.781107	9.782638	56
5	15	768640	770226	771805	773377	774942	776500	778051	779596	781133	782663	55
6	30	768667	770253	771832	773403	774968	776526	778077	779621	781159	782689	54
7	45	768693	770279	771858	773429	774994	776552	778103	779647	781184	782715	53
		2′	17′	32′	47′	2′	17′	32′	47′	2′	17′	
8	0	9.768720	9.770305	9.771884	9.773456	9.775020	9.776578	9.778129	9.779673	9.781210	9.782740	52
9	15	768746	770332	771910	773482	775046	776604	778155	779698	781235	782765	51
10	30	768773	770358	771937	773508	775072	776629	778180	779724	781261	782791	50
11	45	768799	770385	771963	773534	775098	776656	778206	779750	781286	782816	49
		3′	18′	33′	48′	3′	18′	33′	48′	3′	18′	
12	0	9.768826	9.770411	9.771989	9.773560	9.775124	9.776682	9.778232	9.779775	9.781312	9.782842	48
13	15	768852	770437	772015	773586	775150	776707	778258	779801	781337	782867	47
14	30	768879	770464	772042	773612	775176	776733	778284	779827	781363	782893	46
15	45	768905	770490	772068	773639	775202	776759	778309	779852	781389	782918	45
		4′	19′	34′	49′	4′	19′	34′	49′	4′	19′	
16	0	9.768932	9.770516	9.772094	9.773665	9.775228	9.776785	9.778335	9.779878	9.781414	9.782943	44
17	15	768958	770543	772120	773691	775254	776811	778361	779904	781440	782969	43
18	30	768985	770569	772147	773717	775280	776837	778387	779929	781465	782994	42
19	45	769011	770595	772173	773743	775306	776863	778412	779955	781491	783020	41
		5′	20′	35′	50′	5′	20′	35′	50′	5′	20′	
20	0	9.769038	9.770622	9.772199	9.773769	9.775332	9.776889	9.778438	9.779981	9.781516	9.783045	40
21	15	769064	770648	772225	773795	775358	776915	778464	780006	781542	783070	39
22	30	769090	770674	772251	773821	775384	776940	778490	780032	781567	783096	38
23	45	769117	770701	772277	773847	775410	776966	778515	780057	781593	783121	37
		6′	21′	36′	51′	6′	21′	36′	51′	6′	21′	
24	0	9.769143	9.770727	9.772304	9.773874	9.775436	9.776992	9.778541	9.780083	9.781618	9.783147	36
25	15	769170	770753	772330	773900	775462	777018	778567	780109	781644	783173	35
26	30	769196	770780	772356	773926	775488	777044	778593	780135	781670	783198	34
27	45	769223	770806	772382	773952	775514	777070	778618	780160	781695	783223	33
		7′	22′	37′	52′	7′	22′	37′	52′	7′	22′	
28	0	9.769249	9.770832	9.772409	9.773978	9.775540	9.777096	9.778644	9.780186	9.781721	9.783248	32
29	15	769276	770859	772435	774004	775566	777122	778670	780211	781746	783274	31
30	30	769302	770885	772461	774030	775592	777147	778696	780237	781772	783299	30
31	45	769328	770911	772487	774056	775618	777173	778721	780263	781797	783325	29
		8′	23′	38′	53′	8′	23′	38′	53′	8′	23′	
32	0	9.769355	9.770938	9.772514	9.774082	9.775644	9.777199	9.778747	9.780288	9.781823	9.783350	28
33	15	769381	770964	772540	774108	775670	777225	778773	780314	781848	783375	27
34	30	769408	770990	772566	774135	775696	777251	778799	780340	781874	783401	26
35	45	769434	771017	772592	774161	775722	777277	778824	780365	781899	783426	25
		9′	24′	39′	54′	9′	24′	39′	54′	9′	24′	
36	0	9.769461	9.771043	9.772618	9.774187	9.775748	9.777303	9.778850	9.780391	9.781925	9.783452	24
37	15	769487	771069	772645	774213	775774	777328	778876	780416	781950	783477	23
38	30	769514	771096	772671	774239	775800	777354	778902	780442	781976	783502	22
39	45	769540	771122	772697	774265	775826	777380	778927	780468	782001	783528	21
		10′	25′	40′	55′	10′	25′	40′	55′	10′	25′	
40	0	9.769566	9.771148	9.772723	9.774291	9.775852	9.777406	9.778953	9.780493	9.782027	9.783553	20
41	15	769593	771174	772749	774317	775878	777432	778979	780519	782052	783579	19
42	30	769619	771201	772776	774343	775904	777458	779005	780545	782078	783604	18
43	45	769646	771227	772802	774369	775930	777483	779030	780570	782103	783629	17
		11′	26′	41′	56′	11′	26′	41′	56′	11′	26′	
44	0	9.769672	9.771253	9.772828	9.774395	9.775956	9.777509	9.779056	9.780596	9.782129	9.783655	16
45	15	769698	771280	772854	774421	775982	777535	779082	780621	782154	783680	15
46	30	769725	771306	772880	774447	776008	777561	779107	780647	782180	783706	14
47	45	769751	771332	772906	774473	776034	777587	779133	780672	782205	783731	13
		12′	27′	42′	57′	12′	27′	42′	57′	12′	27′	
48	0	9.769778	9.771359	9.772933	9.774500	9.776060	9.777613	9.779159	9.780698	9.782231	9.783756	12
49	15	769804	771385	772959	774526	776085	777638	779185	780724	782256	783782	11
50	30	769831	771411	772985	774551	776111	777664	779210	780749	782282	783807	10
51	45	769857	771437	773011	774578	776137	777690	779236	780775	782307	783832	9
		13′	28′	43′	58′	13′	28′	43′	58′	13′	28′	
52	0	9.769883	9.771464	9.773037	9.774604	9.776163	9.777716	9.779262	9.780801	9.782333	9.783858	8
53	15	769910	771490	773063	774630	776189	777742	779287	780826	782358	783883	7
54	30	769936	771516	773090	774656	776215	777768	779313	780852	782383	783908	6
55	45	769962	771543	773116	774682	776241	777793	779339	780877	782409	783934	5
		14′	29′	44′	59′	14′	29′	44′	59′	14′	29′	
56	0	9.769989	9.771569	9.773142	9.774708	9.776267	9.777819	9.779364	9.780903	9.782434	9.783959	4
57	15	770015	771595	773168	774734	776293	777845	779390	780928	782460	783984	3
58	30	770042	771621	773194	774760	776319	777871	779416	780954	782485	784010	2
59	45	770068	771648	773220	774786	776345	777897	779441	780980	782511	784035	1
60	60	9.770094	9.771674	9.773247	9.774812	9.776371	9.777922	9.779467	9.781005	9.782536	9.784061	0
sec.		19m	18m	17m	16m	15m	14m	13m	12m	11m	10m	sec.

17 Hours. 17 Hours.

6 Hours.	Log. Haversines.									6 Hours.	
	50m	51m	52m	53m	54m	55m	56m	57m	58m	59m	
	102 deg.		103 deg.				104 deg.				
Sec.											Sec.
	0′ 20′	40′	0′	13′	30′	43′	0′	13′	30′	43′	
0	9.784061	9.785578	9.787089	9.788593	9.790090	9.791580	9.793064	9.794541	9.796012	9.797476	60
1	15 784086	785603	787114	788618	790115	791605	793089	794566	796036	797500	59
2	30 784111	785629	787139	788643	790140	791630	793114	794591	796061	797525	58
3	45 784137	785654	787164	788668	790165	791655	793138	794615	796085	797549	57
	0′ 21′	40′	1′	14′	31′	46′	1′	16′	31′	46′	
4	9.784162	9.785679	9.787189	9.788693	9.790189	9.791680	9.793163	9.794640	9.796110	9.797573	56
5	15 784187	785704	787214	788718	790214	791704	793188	794664	796134	797598	55
6	30 784213	785729	787239	788743	790239	791729	793212	794689	796159	797622	54
7	45 784238	785755	787264	788768	790264	791754	793237	794713	796183	797646	53
	0′ 22′	42′	2′	17′	32′	47′	2′	17′	32′	47′	
8	9.784263	9.785780	9.787290	9.788793	9.790289	9.791779	9.793262	9.794738	9.796208	9.797671	52
9	15 784289	785805	787315	788818	790314	791803	793286	794762	796232	797695	51
10	30 784314	785830	787340	788843	790339	791828	793311	794787	796256	797719	50
11	45 784339	785855	787365	788868	790364	791853	793336	794812	796281	797744	49
	0′ 23′	43′	3′	18′	33′	48′	3′	18′	33′	48′	
12	9.784365	9.785881	9.787390	9.788893	9.790389	9.791878	9.793360	9.794836	9.796305	9.797768	48
13	15 784390	785906	787415	788918	790413	791902	793385	794861	796330	797792	47
14	30 784415	785931	787440	788943	790438	791927	793410	794885	796354	797817	46
15	45 784440	785956	787465	788968	790463	791952	793434	794910	796379	797841	45
	0′ 24′	43′	4′	19′	34′	49′	4′	19′	34′	49′	
16	9.784466	9.785982	9.787490	9.788993	9.790488	9.791977	9.793459	9.794934	9.796403	9.797865	44
17	15 784491	786007	787515	789018	790513	792001	793483	794959	796427	797890	43
18	30 784517	786032	787541	789043	790538	792026	793508	794983	796452	797914	42
19	45 784542	786057	787566	789067	790563	792051	793533	795008	796476	797938	41
	0′ 25′	45′	5′	20′	35′	50′	5′	20′	35′	50′	
20	9.784567	9.786082	9.787591	9.789093	9.790588	9.792076	9.793557	9.795032	9.796501	9.797962	40
21	15 784592	786107	787616	789117	790612	792100	793582	795057	796525	797987	39
22	30 784618	786133	787641	789142	790637	792125	793607	795081	796550	798011	38
23	45 784643	786158	787666	789167	790662	792150	793631	795106	796574	798035	37
	0′ 26′	46′	6′	21′	36′	51′	6′	21′	36′	51′	
24	9.784668	9.786183	9.787691	9.789192	9.790687	9.792175	9.793656	9.795130	9.796598	9.798060	36
25	15 784694	786208	787716	789217	790712	792199	793681	795155	796623	798084	35
26	30 784719	786234	787741	789242	790737	792224	793705	795180	796647	798108	34
27	45 784744	786259	787766	789267	790761	792249	793730	795204	796672	798133	33
	0′ 27′	46′	7′	22′	37′	52′	7′	22′	37′	52′	
28	9.784770	9.786284	9.787791	9.789292	9.790786	9.792274	9.793754	9.795229	9.796696	9.798157	32
29	15 784795	786309	787816	789317	790811	792298	793779	795253	796720	798181	31
30	30 784820	786334	787842	789342	790836	792323	793804	795278	796745	798205	30
31	45 784845	786359	787867	789367	790861	792348	793828	795302	796769	798230	29
	0′ 28′	47′	8′	23′	38′	53′	8′	23′	38′	53′	
32	9.784871	9.786385	9.787892	9.789392	9.790886	9.792373	9.793853	9.795327	9.796794	9.798254	28
33	15 784896	786410	787917	789417	790911	792397	793878	795351	796818	798278	27
34	30 784921	786435	787942	789442	790935	792422	793902	795376	796842	798303	26
35	45 784946	786460	787967	789467	790960	792447	793927	795400	796867	798327	25
	0′ 29′	47′	9′	24′	39′	54′	9′	24′	39′	54′	
36	9.784972	9.786485	9.787992	9.789492	9.790985	9.792472	9.793951	9.795425	9.796891	9.798351	24
37	15 784997	786510	788017	789517	791010	792496	793976	795449	796916	798375	23
38	30 785022	786536	788042	789542	791035	792521	794001	795474	796940	798400	22
39	45 785048	786561	788067	789567	791059	792546	794025	795498	796964	798424	21
	0′ 30′	48′	10′	25′	40′	55′	10′	25′	40′	55′	
40	9.785073	9.786586	9.788092	9.789592	9.791084	9.792570	9.794050	9.795523	9.796989	9.798448	20
41	15 785098	786611	788117	789617	791109	792595	794074	795547	797013	798473	19
42	30 785124	786636	788142	789641	791134	792620	794099	795572	797037	798497	18
43	45 785149	786661	788167	789666	791159	792644	794124	795596	797062	798521	17
	0′ 31′	48′	11′	26′	41′	56′	11′	26′	41′	56′	
44	9.785174	9.786687	9.788192	9.789691	9.791184	9.792669	9.794148	9.795621	9.797086	9.798545	16
45	15 785199	786712	788217	789716	791209	792694	794173	795645	797111	798570	15
46	30 785225	786737	788242	789741	791233	792719	794197	795669	797135	798594	14
47	45 785250	786762	788267	789766	791258	792743	794222	795694	797159	798618	13
	0′ 32′	49′	12′	27′	42′	57′	12′	27′	42′	57′	
48	9.785275	9.786787	9.788292	9.789791	9.791283	9.792768	9.794247	9.795718	9.797184	9.798642	12
49	15 785300	786812	788317	789816	791308	792793	794271	795743	797208	798667	11
50	30 785326	786837	788343	789841	791332	792817	794296	795767	797232	798691	10
51	45 785351	782862	788367	789866	791357	792842	794320	795792	797257	798715	9
	0′ 33′	50′	13′	28′	43′	58′	13′	28′	43′	58′	
52	9.785376	9.786888	9.788393	9.789891	9.791382	9.792867	9.794345	9.795816	9.797281	9.798739	8
53	15 785401	786913	788418	789916	791407	792891	794369	795841	797305	798764	7
54	30 785427	786938	788443	789941	791432	792916	794394	795865	797330	798788	6
55	45 785452	786963	788468	789965	791456	792941	794419	795890	797354	798812	5
	0′ 34′	50′	14′	29′	44′	59′	14′	29′	44′	59′	
56	9.785477	9.786988	9.788493	9.789990	9.791481	9.792966	9.794443	9.795914	9.797379	9.798836	4
57	15 785502	787013	788518	790015	791506	792980	794468	795939	797403	798861	3
58	30 785528	787038	788543	790040	791531	793015	794492	795963	797427	798885	2
59	45 785553	787064	788568	790065	791556	793040	794517	795988	797452	798909	1
60	60 9.785578	9.787089	9.788593	9.790090	9.791580	9.793064	9.794541	9.796012	9.797476	9.798933	0
Sec.	9m	8m	7m	6m	5m	4m	3m	2m	1m	0m	Sec.

17 Hours. 17 Hours.

7 Hours.				Log. Haversines.				7 Hours.		
	0m	1m	2m	3m	4m	5m	6m	7m	8m	9m	
	105 deg.				106 deg.				107 deg.		
sec.	′ 0′	15′	30′	45′	0′	15′	30′	45′	0′	15′	sec.
0	0 9.798933	9.800384	9.801828	9.803266	9.804697	9.806122	9.807540	9.808952	9.810357	9.811756	60
1	15 798958	800408	801852	803290	804721	806146	807564	808975	810381	811780	59
2	30 798982	800432	801876	803314	804745	806169	807587	808999	810404	811803	58
3	45 799006	800456	801900	803338	804769	806193	807611	809022	810428	811826	57
	1′	16′	31′	46′	1′	16′	31′	46′	1′	16′	
4	0 9.799030	9.800481	9.801924	9.803362	9.804792	9.806217	9.807635	9.809046	9.810451	9.811849	56
5	15 799054	800505	801948	803386	804816	806240	807658	809069	810474	811873	55
6	30 799079	800529	801972	803409	804840	806264	807682	809093	810498	811896	54
7	45 799103	800553	801996	803433	804864	806288	807705	809116	810521	811919	53
	2′	17′	32′	47′	2′	17′	32′	47′	2′	17′	
8	0 9.799127	9.800577	9.802020	9.803457	9.804888	9.806311	9.807729	9.809140	9.810544	9.811943	52
9	15 799151	800601	802044	803481	804911	806335	807752	809163	810568	811966	51
10	30 799176	800625	802068	803505	804935	806359	807776	809187	810591	811989	50
11	45 799200	800649	802092	803529	804959	806382	807800	809210	810614	812012	49
	3′	18′	33′	48′	3′	18′	33′	48′	3′	18′	
12	0 9.799224	9.800673	9.802116	9.803553	9.804983	9.806406	9.807823	9.809234	9.810638	9.812035	48
13	15 799248	800698	802140	803577	805006	806430	807847	809257	810661	812059	47
14	30 799272	800722	802164	803601	805030	806453	807870	809281	810684	812082	46
15	45 799297	800746	802188	803624	805054	806477	807894	809304	810708	812105	45
	4′	19′	34′	49′	4′	19′	34′	49′	4′	19	
16	0 9.799321	9.800770	9.802212	9.803648	9.805078	9.806501	9.807917	9.809327	9.810731	9.812128	44
17	15 799345	800794	802236	803672	805102	806524	807941	809351	810755	812152	43
18	30 799369	800818	802260	803696	805125	806548	807964	809374	810778	812175	42
19	45 799393	800842	802284	803720	805149	806572	807988	809398	810801	812198	41
	5′	20′	35′	50′	5′	20′	35′	50′	5′	20′	
20	0 9.799418	9.800866	9.802308	9.803744	9.805173	9.806595	9.808012	9.809421	9.810824	9.812221	40
21	15 799442	800890	802332	803768	805197	806619	808035	809445	810848	812245	39
22	30 799466	800914	802356	803792	805220	806643	808059	809468	810871	812268	38
23	45 799490	800938	802380	803815	805244	806666	808082	809491	810895	812291	37
	6′	21′	36′	51′	6′	21′	36′	51′	6′	21′	
24	0 9.799514	9.800963	9.802404	9.803839	9.805268	9.806690	9.808106	9.809515	9.810918	9.812314	36
25	15 799539	800987	802428	803863	805292	806714	808129	809538	810942	812337	35
26	30 799563	801011	802452	803887	805315	806737	808153	809562	810964	812361	34
27	45 799587	801035	802476	803911	805339	806761	808176	809585	810988	812384	33
	7′	22′	37′	52′	7′	22′	37′	52′	7′	22′	
28	0 9.799611	9.801059	9.802500	9.803935	9.805363	9.806785	9.808200	9.809609	9.811011	9.812407	32
29	15 799635	801083	802524	803959	805387	806808	808223	809632	811034	812430	31
30	30 799660	801107	802548	803982	805410	806832	808247	809656	811058	812454	30
31	45 799684	801131	802572	804006	805434	806856	808270	809679	811081	8.2477	29
	8′	23′	38′	53′	8′	23′	38′	53′	8′	23′	
32	0 9.799708	9.801155	9.802596	9.804030	9.805458	9.806879	9.808294	9.809702	9.811104	9.812500	28
33	15 799732	801179	802620	804054	805482	806903	808317	809726	811128	812523	27
34	30 799756	801203	802644	804078	805505	806926	808341	809749	811151	812546	26
35	45 799780	801227	802668	804102	805529	806949	808365	809773	811174	812570	25
	9′	24′	39′	54′	9′	24′	39′	54′	9′	24′	
36	0 9.799805	9.801251	9.802692	9.804126	9.805553	9.806974	9.808388	9.809796	9.811198	9.812593	24
37	15 799829	801275	802716	804150	805577	806997	808412	809819	811221	812616	23
38	30 799853	801300	802740	804173	805600	807021	808435	809843	811244	812639	22
39	45 799877	801324	802764	804197	805624	807045	808459	809866	811267	812662	21
	10′	25′	40′	55′	10′	25′	40′	55′	10′	25′	
40	0 9.799901	9.801348	9.802788	9.804221	9.805648	9.807068	9.808482	9.809890	9.811291	9.812686	20
41	15 799925	801372	802811	804245	805672	807092	808506	809913	811314	812709	19
42	30 799950	801396	802835	804269	805695	807115	808529	809936	811337	812732	18
43	45 799974	801420	802859	804292	805719	807139	808553	809960	811361	812755	17
	11′	26′	41′	56′	11′	26′	41′	56′	11′	26′	
44	0 9.799998	9.801444	9.802883	9.804316	9.805743	9.807163	9.808576	9.809983	9.811384	9.812778	16
45	15 800022	801468	802907	804340	805766	807186	808600	810007	811407	812801	15
46	30 800046	801492	802931	804364	805790	807210	808623	810030	811431	812825	14
47	45 800070	801516	802955	804388	805814	807233	808647	810053	811454	812848	13
	12′	27′	42′	57′	12′	27′	42′	57′	12′	27′	
48	0 9.800094	9.801540	9.802979	9.804412	9.805838	9.807257	9.808670	9.810077	9.811477	9.812871	12
49	15 800119	801564	803003	804435	805861	807281	808694	810100	811500	812894	11
50	30 800143	801588	803027	804459	805885	807304	808717	810124	811524	812917	10
51	45 800167	801612	803051	804483	805909	807328	808741	810147	811547	812941	9
	13′	28′	43′	58′	13′	28′	43′	58′	13′	28′	
52	0 9.800191	9.801636	9.803075	9.804507	9.805932	9.807351	9.808764	9.810170	9.811570	9.812964	8
53	15 800215	801660	803099	804531	805956	807375	808788	810194	811594	812987	7
54	30 800239	801684	803123	804554	805980	807399	808811	810217	811617	813010	6
55	45 800263	801708	803147	804578	806003	807422	808835	810241	811640	813033	5
	14′	29′	44′	59′	14′	29′	44′	59′	14′	29′	
56	0 9.800288	9.801732	9.803170	9.804602	9.806027	9.807446	9.808858	9.810264	9.811663	9.813056	4
57	15 800312	801756	803194	804626	806051	807469	808882	810287	811687	813080	3
58	30 800336	801780	803218	804650	806075	807493	808905	810311	811710	813103	2
59	45 800360	801804	803242	804673	806098	807517	808929	810334	811733	813126	1
60	60 9.800384	9.801828	9.803266	9.804697	9.806122	9.807540	9.808952	9.810357	9.811756	9.813149	0
sec.	59m	58m	57m	56m	55m	54m	53m	52m	51m	50m	sec.

7 Hours.		Log. Haversines.						7 Hours.				
		10m	11m	12m	13m	14m	15m	16m	17m	18m	19m	
		107 deg.		108 deg.				109 deg.				
sec.												sec.
		0′ 15′ 30′ 45′		0′ 15′ 30′ 45′				0′ 15′ 30′ 45′				
0	0	9.813149	9.814535	9.815915	9.817289	9.818656	9.820017	9.821372	9.822721	9.824063	9.825399	60
1	15	813172	814558	815958	817312	818679	820040	821394	822743	824085	825421	59
2	30	813195	814581	815961	817335	818702	820063	821417	822765	824108	825444	58
3	45	813218	814604	815984	817357	818724	820085	821440	822788	824130	825466	57
		31′ 46′		1′ 16′ 31′ 46′				1′ 16′ 31′ 46′				
4	0	9.813242	9.814628	9.816007	9.817380	9.818747	9.820108	9.821462	9.822810	9.824152	9.825488	56
5	15	813265	814651	816030	817403	818770	820130	821485	822833	824174	825510	55
6	30	813288	814674	816053	817426	818793	820153	821507	822855	824197	825532	54
7	45	813311	814697	816076	817449	818815	820176	821530	822877	824219	825554	53
		32′ 47′		2′ 17′ 32′ 47′				2′ 17′ 32′ 47′				
8	0	9.813334	9.814720	9.816099	9.817472	9.818838	9.820198	9.821552	9.822900	9.824241	9.825577	52
9	15	813357	814743	816122	817495	818861	820221	821575	822922	824264	825599	51
10	30	813381	814766	816145	817517	818884	820244	821597	822945	824286	825621	50
11	45	813404	814789	816168	817540	818906	820266	821620	822967	824308	825643	49
		33′ 48′		3′ 18′ 33′ 48′				3′ 18′ 33′ 48′				
12	0	9.813427	9.814812	9.816191	9.817563	9.818929	9.820289	9.821642	9.822990	9.824331	9.825666	48
13	15	813450	814835	816214	817586	818952	820311	821665	823012	824353	825688	47
14	30	813473	814858	816236	817609	818974	820334	821687	823034	824375	825710	46
15	45	813496	814881	816259	817631	818997	820356	821710	823057	824397	825732	45
		34′ 49′		4′ 19′ 34′ 49′				4′ 19′ 34′ 49′				
16	0	9.813519	9.814904	9.816282	9.817654	9.819020	9.820379	9.821732	9.823079	9.824420	9.825754	44
17	15	813542	814927	816305	817677	819042	820402	821755	823101	824442	825776	43
18	30	813566	814950	816328	817700	819065	820424	821777	823124	824464	825799	42
19	45	813589	814973	816351	817723	819088	820447	821800	823146	824487	825821	41
		35′ 50′		5′ 20′ 35′ 50′				5′ 20′ 35′ 50′				
20	0	9.813612	9.814996	9.816374	9.817745	9.819111	9.820470	9.821822	9.823169	9.824509	9.825843	40
21	15	813635	815019	816397	817768	819133	820492	821845	823191	824531	825865	39
22	30	813658	815042	816420	817791	819156	820515	821867	823214	824554	825887	38
23	45	813681	815065	816443	817814	819179	820537	821890	823236	824576	825910	37
		36′ 51′		6′ 21′ 36′ 51′				6′ 21′ 36′ 51′				
24	0	9.813704	9.815088	9.816465	9.817837	9.819201	9.820560	9.821912	9.823258	9.824598	9.825932	36
25	15	813727	815111	816488	817859	819224	820582	821935	823281	824620	825954	35
26	30	813751	815134	816511	817882	819247	820605	821957	823303	824643	825976	34
27	45	813774	815157	816534	817905	819270	820628	821980	823325	824665	825998	33
		37′ 52′		7′ 22′ 37′ 52′				7′ 22′ 37′ 52′				
28	0	9.813797	9.815180	9.816557	9.817928	9.819292	9.820650	9.822002	9.823348	9.824687	9.826020	32
29	15	813820	815203	816580	817950	819315	820673	822025	823370	824710	826043	31
30	30	813843	815226	816603	817973	819338	820695	822047	823393	824732	826065	30
31	45	813866	815249	816626	817996	819360	820718	822070	823415	824754	826087	29
		38′ 53′		8′ 23′ 38′ 53′				8′ 23′ 38′ 53′				
32	0	9.813889	9.815272	9.816649	9.818019	9.819383	9.820741	9.822092	9.823437	9.824776	9.826109	28
33	15	813912	815295	816671	818042	819405	820763	822115	823460	824799	826131	27
34	30	813935	815318	816694	818064	819428	820786	822137	823482	824821	826153	26
35	45	813958	815341	816717	818087	819451	820808	822159	823504	824843	826176	25
		39′ 54′		9′ 24′ 39′ 54′				9′ 24′ 39′ 54′				
36	0	9.813982	9.815364	9.816740	9.818110	9.819474	9.820831	9.822182	9.823527	9.824865	9.826198	24
37	15	814005	815387	816763	818133	819496	820853	822204	823549	824888	826220	23
38	30	814028	815410	816786	818156	819519	820876	822227	823571	824909	826242	22
39	45	814051	815433	816809	818178	819542	820899	822249	823594	824932	826264	21
		40′ 55′		10′ 25′ 40′ 55′				10′ 25′ 40′ 55′				
40	0	9.814074	9.815456	9.816832	9.818201	9.819564	9.820921	9.822272	9.823616	9.824954	9.826286	20
41	15	814097	815479	816855	818224	819587	820944	822294	823638	824977	826308	19
42	30	814120	815502	816877	818247	819609	820966	822317	823661	824999	826331	18
43	45	814143	815525	816900	818269	819632	820989	822339	823683	825021	826353	17
		41′ 56′		11′ 26′ 41′ 56′				11′ 26′ 41′ 56′				
44	0	9.814166	9.815548	9.816923	9.818292	9.819655	9.821011	9.822362	9.823706	9.825043	9.826375	16
45	15	814189	815571	816946	818315	819678	821034	822384	823728	825066	826397	15
46	30	814212	815594	816969	818338	819700	821057	822407	823750	825088	826419	14
47	45	814235	815617	816992	818360	819723	821079	822429	823773	825110	826441	13
		42′ 57′		12′ 27′ 42′ 57′				12′ 27′ 42′ 57′				
48	0	9.814259	9.815640	9.817015	9.818383	9.819746	9.821102	9.822451	9.823795	9.825132	9.826464	12
49	15	814282	815663	817037	818406	819768	821124	822474	823817	825155	826486	11
50	30	814305	815686	817060	818429	819791	821147	822496	823840	825177	826508	10
51	45	814328	815709	817083	818451	819813	821169	822519	823862	825199	826530	9
		43′ 58′		13′ 28′ 43′ 58′				13′ 28′ 43′ 58′				
52	0	9.814351	9.815732	9.817106	9.818474	9.819836	9.821192	9.822541	9.823884	9.825221	9.826552	8
53	15	814374	815755	817129	818497	819859	821214	822564	823907	825243	826574	7
54	30	814397	815778	817152	818520	819881	821237	822586	823929	825266	826596	6
55	45	814420	815800	817175	818542	819904	821259	822608	823951	825288	826618	5
		44′ 59′		14′ 29′ 44′ 59′				14′ 29′ 44′ 59′				
56	0	9.814443	9 815823	9.817198	9.818565	9.819927	9.821282	9.822631	9.823974	9.825310	9.826641	4
57	15	814466	815846	817221	818588	819949	821304	822653	823996	825332	826663	3
58	30	814489	815869	817243	818611	819972	821327	822676	824018	825355	826685	2
59	45	814512	815892	817266	818633	819995	821349	822698	824041	825377	826707	1
60	60	9.814535	9.815915	9.817289	9.818656	9.820017	9.821372	9.822721	9.824063	9.825399	9.826729	0
sec.		49m	48m	47m	46m	45m	44m	43m	42m	41m	40m	sec.

7 Hours.	Log. Haversines.								7 Hours.		
	20m	21m	22m	23m	24m	25m	26m	27m	28m	29m	
	110 deg.				111 deg.				112 deg.		
sec.	′ 0′	15′	30′	45′	0′	15′	30′	45′	0′	15′	sec.
0	0 9.826729	9.828053	9.829370	9.830682	9.831987	9.833287	9.834580	9.835867	9.837148	9.838424	60
1	15 826751	828075	829392	830704	832009	833308	834601	835889	837170	838445	59
2	30 826773	828097	829414	830726	832031	833330	834623	835910	837191	838466	58
3	45 826795	828119	829436	830747	832053	833352	834645	835931	837212	838487	57
	1′	16′	31′	46′	1′	16′	31′	46′	1′	16′	
4	0 9.826817	9.828141	9.829458	9.830769	9.832074	9.833373	9.834666	9.835953	9.837234	9.838508	56
5	15 826840	828163	829480	830791	832096	833395	834687	835974	837255	838530	55
6	30 826862	828185	829502	830813	832118	833416	834709	835995	837276	838551	54
7	45 826884	828207	829524	830835	832139	833438	834731	836017	837297	838572	53
	2′	17′	32′	47′	2′	17′	32′	47′	2′	17′	
8	0 9.826906	9.828229	9.829546	9.830856	9.832161	9.833460	9.834752	9.836038	9.837319	9.838593	52
9	15 826928	828251	829568	830878	832183	833481	834773	836060	837340	838614	51
10	30 8 6950	828 73	829589	830900	832204	833503	834795	836081	837361	838636	50
11	45 826972	828295	829611	830922	832226	833524	834816	836103	837383	838657	49
	3′	18′	33′	48′	3′	18′	33′	48′	3′	18′	
12	0 9.826994	9.828317	9.829633	9.830944	9.832248	9.833546	9.834838	9.836124	9.837404	9.838678	48
13	15 827016	828339	8.9655	830965	832270	833567	834859	836145	837425	838699	47
14	30 827038	828361	829677	830987	832291	833589	834881	836167	837447	838720	46
15	45 827060	828383	829699	831009	832313	833611	834902	836188	837468	838741	45
	4′	19′	34′	49′	4′	19′	34′	49′	4′	19′	
16	0 9.827083	9.828405	9.829721	9.831031	9.832335	9.833632	9.834924	9.836209	9.837489	9.838763	44
17	15 827105	828427	829743	831052	832356	833654	834945	836231	837510	838784	43
18	30 827127	828449	829765	831074	832378	833675	834967	836252	837532	838805	42
19	45 827149	828471	829786	831096	832400	833697	834988	836274	837553	838826	41
	5′	20′	35′	50′	5′	20′	35′	50′	5′	20′	
20	0 9.827171	9.828493	9.829808	9.831118	9.832421	9.833719	9.835010	9.836295	9.837574	9.838847	40
21	15 827193	828515	829830	831140	832443	833740	835031	836316	837595	838868	39
22	30 827215	828537	829852	831161	832465	833762	835053	836338	837617	838890	38
23	45 827237	828559	829874	831183	832486	833783	835074	836359	837638	838911	37
	6′	21′	36′	51′	6′	21′	36′	51′	6′	21′	
24	0 9.827259	9.828581	9.829896	9.831205	9.832508	9.833805	9.835096	9.836380	9.837659	9.838932	36
25	15 827281	828603	829918	831227	832530	833826	835117	836402	837680	838953	35
26	30 827303	828625	829940	831248	832551	833848	835139	836423	837702	838974	34
27	45 827325	828646	829961	831270	832573	833869	835160	836444	837723	838995	33
	7′	22′	37′	52′	7′	22′	37′	52′	7′	22′	
28	0 9.827348	9.828668	9.829983	9.831292	9.832595	9.833891	9.835181	9.836466	9.837744	9.839017	32
29	15 827370	828690	830005	831314	832616	833913	835203	836487	837765	839038	31
30	30 827392	828712	830027	831335	832638	833934	835224	836509	837787	839059	30
31	45 827414	828734	830049	831357	832659	833956	835246	836530	837808	839080	29
	8′	23′	38′	53′	8′	23′	38′	53′	8′	23′	
32	0 9.827436	9.828756	9.830071	9.831379	9.832681	9.833977	9.835267	9.836551	9.837829	9.839101	28
33	15 827458	828778	830093	831401	832703	833999	835289	836573	837850	839122	27
34	30 827480	828800	830114	831422	832724	834020	835310	836594	837872	839144	26
35	45 827502	828822	830136	831444	832746	834042	835332	836615	837893	839165	25
	9′	24′	39′	54′	9′	24′	39′	54′	9′	24′	
36	0 9.827524	9.828844	9.830158	9.831466	9.832768	9.834063	9.835353	9.836637	9.837914	9.839186	24
37	15 827546	828866	830180	831488	832789	834085	835375	836658	837935	839207	23
38	30 827568	828888	830202	831509	832811	834107	835396	836679	837957	839228	22
39	45 827590	828910	830224	831531	832833	834128	835417	836701	837978	839249	21
	10′	25′	40′	55′	10′	25′	40′	55′	10′	25′	
40	0 9.827612	9.828932	9.830246	9.831553	9.832854	9.834150	9.835439	9.836722	9.837999	9.839270	20
41	15 827634	828954	830267	831575	832876	834171	835460	836743	838020	839291	19
42	30 827656	828976	830289	831596	832898	834193	835482	836765	838042	839313	18
43	45 827678	828998	830311	831618	832919	834214	835503	836786	838063	839334	17
	11′	26′	41′	56′	11′	26′	41′	56′	11′	26′	
44	0 9.827700	9.829020	9.830333	9.831640	9.832941	9.834236	9.835525	9.836807	9.838084	9.839355	16
45	15 827722	829042	830355	831662	832962	834257	835546	836829	838105	839376	15
46	30 827744	829064	830377	831683	832984	834279	835567	836850	838127	839397	14
47	45 827766	829085	830398	831705	833006	834300	835589	836871	838148	839418	13
	12′	27′	42′	57′	12′	27′	42′	57′	12′	27′	
48	0 9.827789	9.829107	9.830420	9.831727	9.833027	9.834322	9.835610	9.836893	9.838169	9.839439	12
49	15 827811	829129	830442	831749	833049	834343	835632	836914	838190	839461	11
50	30 827833	829151	830464	831770	833071	834365	835653	836935	838211	839482	10
51	45 827855	829173	830486	831792	833092	834386	835675	836957	838233	839503	9
	13′	28′	43′	58′	13′	28′	43′	58′	13′	28′	
52	0 9.827877	9.829195	9.830507	9.831814	9.833114	9.834408	9.835696	9.836978	9.838254	9.839524	8
53	15 827899	829217	830529	831836	833135	834429	835717	836999	838275	839545	7
54	30 827921	829239	830551	831857	833157	834451	835739	837021	838296	839566	6
55	45 827943	829261	830573	831879	833179	834472	835760	83704.	838318	839587	5
	14	29′	44′	59′	14′	29′	44′	59′	14′	29′	
56	0 9.827965	9.829283	9.830595	9.831901	9.833200	9.834494	9.835782	9.837063	9.838339	9.839608	4
57	15 827987	829305	830617	831922	833222	834515	835803	837084	838360	839629	3
58	30 828009	829327	830638	831944	833244	834537	835824	837106	838381	839651	2
59	45 828031	829349	830660	831966	833265	834558	835846	837127	838402	839672	1
60	60 9.828053	9.829370	9.830682	9.831987	9.833287	9.834580	9.835867	9.837148	9.838424	9.839693	0
sec.	39m	38m	37m	36m	35m	34m	33m	32m	31m	30m	sec.

16 Hours. 16 Hours.

7 Hours.	Log. Haversines.	7 Hours.

	30m	31m	32m	33m	34m	35m	36m	37m	38m	39m	
	112 deg.		113 deg.				114 deg.				
″	′	′	′	′	′	′	′	′	′	′	″
0	0	0	0	15	30	45	0	15	30	45	60
15	9.839693	9.840956	9.842213	9.843464	9.844710	9.845949	9.847183	9.848410	9.849632	9.850848	59
30	839714	840977	842234	843485	844731	845970	847203	848431	849653	850868	58
45	839735	840998	842255	843506	844751	845990	847224	848451	849673	850889	57
	839756	841019	842276	843527	844772	846011	847244	848472	849693	850909	
	1′	16′	31′	46′							
0	0	0	1′	16′	31′	46′	1′	16′	31′	46′	
15	9.839777	9.841040	9.842297	9.843548	9.844793	9.846032	9.847265	9.848492	9.849714	9.850929	56
30	839798	841061	842318	843568	844813	846052	847285	848512	849734	850949	55
45	839819	841082	842339	843589	844834	846073	847306	848533	849754	850970	54
	839840	841103	842359	843610	844855	846094	847326	848553	849774	850990	53
	2′	17′	32′	47′							
0	0	0	2′	17′	32′	47′	2′	17′	32′	47′	
15	9.839862	9.841124	9.842380	9.843631	9.844875	9.846114	9.847347	9.848574	9.849795	9.851010	52
30	839883	841145	842401	843652	844896	846135	847367	848594	849815	851030	51
45	839904	841166	842422	843672	844917	846155	847388	848615	849835	851050	50
	839925	841187	842443	843693	844938	846176	847408	848635	849856	851070	49
	3′	18′	33′	48′							
0	0	0	3′	18′	33′	48′	3′	18′	33′	48′	
15	9.839946	9.841208	9.842464	9.843714	9.844958	9.846196	9.847429	9.848655	9.849876	9.851091	48
30	839967	841229	842485	843735	844979	846217	847449	848676	849896	851111	47
45	839988	841250	842506	843756	845000	846238	847470	848696	849917	851131	46
	840009	841271	842527	843776	845020	846258	847490	848716	849937	851151	45
	4′	19′	34′	49′							
0	0	0	4′	19′	34′	49′	4′	19′	34′	49′	
15	9.840030	9.841292	9.842547	9.843797	9.845041	9.846279	9.847511	9.848737	9.849957	9.851172	44
30	840051	841313	842568	843818	845062	846299	847531	848757	849977	851192	43
45	840072	841334	842589	843839	845082	846320	847552	848778	849998	851212	42
	840093	841355	842610	843859	845103	846340	847572	848798	850018	851232	41
	5′	20′	35′	50′							
0	0	0	5′	20′	35′	50′	5′	20′	35′	50′	
15	9.840114	9.841376	9.842631	9.843880	9.845124	9.846361	9.847593	9.848818	9.850038	9.851252	40
30	840136	841397	842652	843901	845144	846382	847613	848839	850058	851272	39
45	840157	841418	842673	843922	845165	846402	847634	848859	850079	851293	38
	840178	841439	842694	843943	845186	846423	847654	848879	850099	851313	37
	6′	21′	36′	51′							
0	0	0	6′	21′	36′	51′	6′	21′	36′	51′	
15	9.840199	9.841460	9.842714	9.843963	9.845206	9.846443	9.847675	9.848900	9.850119	9.851333	36
30	840220	841481	842735	843984	845227	846464	847695	848920	850140	851353	35
45	840241	841501	842756	844005	845248	846485	847716	848941	850160	851373	34
	840262	841522	842777	844026	845268	846505	847736	848961	850180	851394	33
	7′	22′	37′	52′							
0	0	0	7′	22′	37′	52′	7′	22′	37′	52′	
15	9.840283	9.841543	9.842798	9.844046	9.845289	9.846526	9.847756	9.848981	9.850200	9.851414	32
30	840304	841564	842819	844067	845310	846546	847777	849002	850221	851434	31
45	840325	841585	842840	844088	845330	846567	847797	849022	850241	851454	30
	840346	841606	842860	844109	845351	846587	847818	849042	850261	851474	29
	8′	23′	38′	53′							
0	0	0	8′	23′	38′	53′	8′	23′	38′	53′	
15	9.840367	9.841627	9.842881	9.844129	9.845372	9.846608	9.847838	9.849063	9.850282	9.851494	28
30	840388	841648	842902	844150	845392	846628	847859	849083	850302	851514	27
45	840409	841669	842923	844171	845413	846649	847879	849104	850322	851535	26
	840430	841690	842944	844192	845434	846670	847900	849124	850342	851555	25
	9′	24′	39′	54′							
0	0	0	9′	24′	39′	54′	9′	24′	39′	54′	
15	9.840451	9.841711	9.842965	9.844212	9.845454	9.846690	9.847920	9.849144	9.850363	9.851575	24
30	840472	841732	842986	844233	845475	846711	847941	849165	850383	851595	23
45	840493	841753	843006	844254	845495	846731	847961	849185	850403	851615	22
	840515	841774	843027	844275	845516	846752	847981	849205	850423	851635	21
	10′	25′	40′	55′							
0	0	0	10′	25′	40′	55′	10′	25′	40′	55′	
15	9.840536	9.841795	9.843048	9.844295	9.845537	9.846772	9.848002	9.849226	9.850444	9.851656	20
30	840557	841816	843069	844316	845557	846793	848022	849246	850464	851676	19
45	840578	841837	843090	844337	845578	846813	848043	849266	850484	851696	18
	840599	841858	843111	844358	845599	846834	848063	849287	850504	851716	17
	11′	26′	41′	56′							
0	0	0	11′	26′	41′	56′	11′	26′	41′	56′	
15	9.840620	9.841879	9.843131	9.844378	9.845619	9.846854	9.848084	9.849307	9.850525	9.851736	16
30	840641	841899	843152	844399	845640	846875	848104	849327	850545	851756	15
45	840662	841920	843173	844420	845661	846896	848125	849348	850565	851777	14
	840683	841941	843194	844440	845681	846916	848145	849368	850585	851797	13
	12′	27′	42′	57′							
0	0	0	12′	27′	42′	57′	12′	27′	42′	57′	
15	9.840704	9.841962	9.843215	9.844461	9.845702	9.846937	9.848165	9.849388	9.850606	9.851817	12
30	840725	841983	843236	844482	845722	846957	848186	849409	850626	851837	11
45	840746	842004	843256	844503	845743	846978	848206	849429	850646	851857	10
	840767	842025	843277	844523	845764	846998	848227	849449	850666	851877	9
	13′	28′	43′	58′							
0	0	0	13′	28′	43′	58′	13′	28′	43′	58′	
15	9.840788	9.842046	9.843298	9.844544	9.845784	9.847019	9.848247	9.849470	9.850686	9.851897	8
30	840809	842067	843319	844565	845805	847039	848268	849490	850707	851917	7
45	840830	842088	843340	844586	845826	847060	848288	849510	850727	851938	6
	840851	842109	843360	844606	845846	847080	848308	849531	850747	851958	5
	14′	29′	44′	59′							
0	0	0	14′	29′	44′	59′	14′	29′	44′	59′	
15	9.840872	9.842130	9.843381	9.844627	9.845867	9.847101	9.848329	9.849551	9.850767	9.851978	4
30	840893	842150	843402	844648	845887	847121	848349	849571	850788	851998	3
45	840914	842171	843423	844668	845908	847142	848370	849592	850808	852018	2
	840935	842192	843444	844689	845929	847162	848390	849612	850828	852038	1
60	9.840956	9.842213	9.843464	9.844710	9.845949	9.847183	9.848410	9.849632	9.850848	9.852058	0
″	29m	28m	27m	26m	25m	24m	23m	22m	21m	20m	″

7 Hours.	Log. Haversines.	7 Hours.

	40m	41m	42m	43m	44m	45m	46m	47m	48m	49m	
	115 deg.				116 deg.				117 deg.		
sec.	′ 0′	15′	30′	45	0	15′	30′	45′	0′	15′	sec.
0	0 9.852058	9.853263	9.854461	9.855654	9.856841	9.858022	9.859198	9.860367	9.861532	9.862690	60
1	15 852078	853283	854481	855674	856861	858042	859217	860387	861551	862709	59
2	30 852099	853303	854501	855694	856880	858061	859237	860406	861570	862728	58
3	45 852119	853323	854521	855713	856900	858081	859256	860426	861590	862748	57
	1′	16′	31′	46′	1′	16′	31′	46′	1′	16′	
4	0 9.852139	9.853343	9.854541	9.855733	9.856920	9.858101	9.859276	9.860445	9.861609	9.862767	56
5	15 852159	853363	854561	855753	856940	858120	859295	860465	861628	862786	55
6	30 852179	853383	854581	855773	856959	858140	859315	860484	861648	862805	54
7	45 852199	853403	854601	855793	856979	858160	859334	860503	861667	862825	53
	2′	17′	32′	47′	2′	17′	32′	47′	2′	17′	
8	0 9.852219	9.853423	9.854621	9.855813	9.856999	9.858179	9.859354	9.860523	9.861686	9.862844	52
9	15 852239	853443	854640	855832	857018	858199	859373	860542	861706	862863	51
10	30 852260	853463	854660	855852	857038	858219	859393	860562	861725	862882	50
11	45 852280	853483	854680	855872	857058	858238	859412	860581	861744	862902	49
	3′	18′	33′	48′	3′	18′	33′	48′	3′	18′	
12	0 9.852300	9.853503	9.854700	9.855892	9.857078	9.858258	9.859432	9.860601	9.861764	9.862921	48
13	15 852320	853523	854720	855912	857097	858278	859452	860620	861783	862940	47
14	30 852340	853543	854740	855931	857117	858297	859471	860640	861802	862959	46
15	45 852360	853563	854760	855951	857137	858317	859491	860659	861822	862979	45
	4′	19′	34′	49′	4′	19′	34′	49′	4′	19′	
16	0 9.852380	9.853583	9.854780	9.855971	9.857157	9.858336	9.859510	9.860678	9.861841	9.862998	44
17	15 852400	853603	854800	855991	857176	858356	859530	860698	861860	863017	43
18	30 852420	853623	854820	856011	857196	858375	859549	860717	861880	863036	42
19	45 852440	853643	854839	856030	857216	858395	859569	860737	861899	863056	41
	5′	20′	35′	50′	5′	20′	35′	50	5′	20′	
20	0 9.852460	9.853663	9.854859	9.856050	9.857235	9.858415	9.859588	9.860756	9.861918	9.863075	40
21	15 852480	853683	854879	856070	857255	858434	859608	860775	861938	863094	39
22	30 852501	853703	854899	856090	857275	858454	859627	860795	861957	863113	38
23	45 852521	853723	854919	856110	857294	858474	859647	860814	861976	863132	37
	6′	21′	36′	51′	6′	21′	36′	51′	6′	21′	
24	0 9.852541	9.853743	9.854939	9.856129	9.857314	9.858493	9.859666	9.860834	9.861996	9.863152	36
25	15 852561	853763	854959	856149	857334	858513	859686	860853	862015	863171	35
26	30 852581	853783	854979	856169	857354	858532	859705	860873	862034	863190	34
27	45 852601	853803	854999	856189	857373	858552	859725	860892	862054	863209	33
	7′	22′	37′	52′	7′	22′	37′	52′	7′	22′	
28	0 9.852621	9.853823	9.855019	9.856209	9.857393	9.858571	9.859741	9.860911	9.862073	9.863229	32
29	15 852641	853843	855038	856228	857413	858591	859764	860931	862092	863248	31
30	30 852661	853863	855058	856248	857432	858611	859783	860950	862111	863267	30
31	45 852681	853883	855078	856268	857452	858630	859803	860970	862131	863286	29
	8′	23′	38′	53′	8′	23′	38′	53′	8′	23′	
32	0 9.852701	9.853903	9.855098	9.856288	9.857472	9.858650	9.859822	9.860989	9.862150	9.863305	28
33	15 852721	853923	855118	856307	857492	858669	859842	861008	862169	863324	27
34	30 852742	853943	855138	856327	857511	858689	859861	861028	862189	863344	26
35	45 852762	853962	855158	856347	857531	858709	859881	861047	862208	863363	25
	9′	24′	39′	54′	9′	24′	39′	54	9′	24′	
36	0 9.852782	9.853983	9.855178	9.856367	9.857550	9.858728	9.859900	9.861067	9.862227	9.863382	24
37	15 852802	854002	855197	856387	857570	858748	859920	861086	862246	863401	23
38	30 852822	854022	855217	856406	857590	858767	859939	861105	862266	863421	22
39	45 852842	854042	855237	856426	857609	858787	859959	861125	862285	863440	21
	10′	25′	40′	55′	10′	25′	40′	55′	10′	25′	
40	0 9.852862	9.854062	9.855257	9.856446	9.857629	9.858807	9.859978	9.861144	9.862304	9.863459	20
41	15 852882	854082	855277	856466	857649	858826	859998	861163	862324	863478	19
42	30 852902	854102	855297	856485	857668	858846	860017	861183	862343	863497	18
43	45 852922	854122	855317	856505	857688	858865	860037	861202	862362	863517	17
	11′	26′	41′	56′	11′	26′	41′	56′	11′	26′	
44	0 9.852942	9.854142	9.855336	9.856525	9.857708	9.858885	9.860056	9.861222	9.862382	9.863536	16
45	15 852962	854162	855356	856545	857727	858904	860075	861241	862401	863555	15
46	30 852982	854182	855376	856565	857747	858924	860095	861260	862420	863574	14
47	45 853002	854202	855396	856584	857767	858943	860114	861280	862440	863593	13
	12′	27′	42′	57′	12′	27′	42′	57′	12′	27′	
48	0 9.853022	9.854222	9.855416	9.856604	9.857786	9.858963	9.860134	9.861299	9.862459	9.863613	12
49	15 853042	854242	855436	856624	857806	858983	860153	861318	862478	863632	11
50	30 853062	854262	855456	856644	857826	859002	860173	861338	862497	863651	10
51	45 853082	854282	855475	856663	857845	859022	860192	861357	862516	863670	9
	13′	28′	43′	58′	13′	28′	43′	58′	13′	28′	
52	0 9.853102	9.854302	9.855495	9.856683	9.857865	9.859041	9.860212	9.861377	9.862536	9.863689	8
53	15 853122	854322	855515	856703	857885	859061	860231	861396	862555	863708	7
54	30 853143	854342	855535	856723	857904	859080	860251	861415	862574	863728	6
55	45 853163	854362	855555	856742	857924	859100	860270	861435	862594	863747	5
	14′	29′	44′	59′	14′	29′	44′	59′	14′	29′	
56	0 9.853183	9.854382	9.855575	9.856762	9.857944	9.859120	9.860290	9.861454	9.862613	9.863766	4
57	15 853203	854401	855594	856782	857963	859139	860309	861473	862632	863785	3
58	30 853223	854421	855614	856801	857983	859159	860329	861493	862651	863804	2
59	45 853243	854441	855634	856821	858002	859178	860348	861512	862671	863823	1
60	60 9.853263	9.854461	9.855654	9.856841	9.858022	9.859198	9.860367	9.861532	9.862690	9.863843	0
sec.	19m	18m	17m	16m	15m	14m	13m	12m	11m	10m	sec.

7 Hours.	Log. Haversines.	7 Hours.

sec.	50m	51m	52m	53m	54m	55m	56m	57m	58m	59m	sec.
	117 deg.			118 deg.			119 deg.				
		30′	45′	0′	15′	30′	45′	0′	15′	30′	45′	
0	0	9.863843	9.864990	9.866131	9.867267	9.868397	9.869522	9.870641	9.871754	9.872862	9.873964	60
1	15	863862	865008	866150	867286	868416	869540	870659	871773	872880	873983	59
2	30	863881	865028	866169	867305	868435	869559	870678	871791	872899	874001	58
3	45	863900	865047	866188	867324	868454	869578	870697	871810	872917	874019	57
		31′	46′	1′	16′	31′	46′	1′	16′	31′	46′	
4	0	9.863919	9.865066	9.866207	9.867342	9.868472	9.869597	9.870715	9.871828	9.872936	9.874038	56
5	15	863938	865085	866226	867361	868491	869615	870734	871847	872954	874056	55
6	30	863958	865104	866245	867380	868510	869634	870752	871865	872973	874074	54
7	45	863977	865123	866264	867399	868529	869653	870771	871884	872991	874093	53
		32′	47′	2′	17′	32′	47′	2′	17′	32′	47′	
8	0	9.863996	9.865142	9.866283	9.867418	9.868547	9.869671	9.870790	9.871902	9.873009	9.874111	52
9	15	864015	865161	866302	867437	868566	869690	870808	871921	873028	874129	51
10	30	864034	865180	866321	867456	868585	869709	870827	871939	873046	874148	50
11	45	864053	865199	866340	867475	868604	869727	870845	871958	873065	874166	49
		33′	48′	3′	18′	33′	48′	3′	18′	33′	48′	
12	0	9.864073	9.865218	9.866359	9.867493	9.868623	9.869746	9.870864	9.871976	9.873083	9.874184	48
13	15	864092	865237	866378	867512	868641	869765	870882	871995	873101	874203	47
14	30	864111	865257	866397	867531	868660	869783	870901	872013	873120	874221	46
15	45	864130	865276	866416	867550	868679	869802	870920	872032	873138	874239	45
		34′	49′	4′	19′	34′	49′	4′	19′	34′	49′	
16	0	9.864149	9.865295	9.866435	9.867569	9.868698	9.869821	9.870938	9.872050	9.873157	9.874257	44
17	15	864168	865314	866454	867588	868716	869839	870957	872069	873175	874276	43
18	30	864187	865333	866473	867607	868735	869858	870975	872087	873193	874294	42
19	45	864206	865352	866492	867625	868754	869877	870994	872106	873212	874312	41
		35′	50′	5′	20′	35′	50′	5′	20′	35′	50′	
20	0	9.864226	9.865371	9.866510	9.867644	9.868773	9.869895	9.871013	9.872124	9.873230	9.874331	40
21	15	864245	865390	866529	867663	868792	869914	871031	872143	873249	874349	39
22	30	864264	865409	866548	867682	868810	869933	871050	872161	873267	874367	38
23	45	864283	865428	866567	867701	868829	869951	871068	872180	873285	874386	37
		36′	51′	6′	21′	36′	51′	6′	21′	36′	51′	
24	0	9.864302	9.865447	9.866586	9.867720	9.868848	9.869970	9.871087	9.872198	9.873304	9.874404	36
25	15	864321	865466	866605	867739	868866	869989	871105	872216	873322	874422	35
26	30	864340	865485	866624	867757	868885	870007	871124	872235	873340	874440	34
27	45	864359	865504	866643	867776	868904	870026	871142	872253	873359	874459	33
		37′	52′	7′	22′	37′	52′	7′	22′	37′	52′	
28	0	9.864379	9.865523	9.866662	9.867795	9.868923	9.870045	9.871161	9.872272	9.873377	9.874477	32
29	15	864398	865542	866681	867814	868941	870063	871180	872290	873396	874495	31
30	30	864417	865561	866700	867833	868960	870082	871198	872309	873414	874514	30
31	45	864436	865580	866719	867852	868979	870100	871217	872327	873432	874532	29
		38′	53′	8′	23′	38′	53′	8′	23′	38′	53′	
32	0	9.864455	9.865599	9.866738	9.867870	9.868998	9.870119	9.871235	9.872346	9.873451	9.874550	28
33	15	864474	865618	866756	867889	869016	870138	871254	872364	873469	874568	27
34	30	864493	865637	866776	867908	869035	870157	871272	872383	873487	874587	26
35	45	864512	865656	866794	867927	869054	870176	871291	872401	873506	874605	25
		39′	54′	9′	24′	39′	54′	9′	24′	39′	54′	
36	0	9.864532	9.865675	9.866813	9.867946	9.869073	9.870194	9.871310	9.872420	9.873524	9.874623	24
37	15	864551	865694	866832	867965	869091	870212	871328	872438	873543	874641	23
38	30	864570	865713	866851	867983	869110	870231	871347	872457	873561	874660	22
39	45	864589	865732	866870	868002	869129	870250	871365	872475	873579	874678	21
		40′	55′	10′	25′	40′	55′	10′	25′	40′	56′	
40	0	9.864608	9.865751	9.866889	9.868021	9.869148	9.870268	9.871384	9.872493	9.873598	9.874696	20
41	15	864627	865770	866908	868040	869166	870287	871402	872512	873616	874714	19
42	30	864646	865789	866927	868059	869185	870306	871421	872530	873634	874733	18
43	45	864665	865808	866946	868078	869204	870324	871439	872549	873653	874751	17
		41′	56′	11′	26′	41′	56′	11′	26′	41′	56′	
44	0	9.864684	9.865827	9.866965	9.868096	9.869222	9.870343	9.871458	9.872567	9.873671	9.874769	16
45	15	864703	865846	866984	868115	869241	870362	871476	872586	873689	874788	15
46	30	864723	865865	867002	868134	869260	870380	871495	872604	873708	874806	14
47	45	864742	865884	867021	868153	869278	870399	871513	872623	873726	874824	13
		42′	57′	12′	27′	42′	57′	12′	27′	42′	57′	
48	0	9.864761	9.865903	9.867040	9.868172	9.869297	9.870417	9.871532	9.872641	9.873744	9.874842	12
49	15	864780	865922	867059	868190	869316	870436	871550	872660	873763	874860	11
50	30	864799	865941	867078	868209	869335	870455	871569	872678	873781	874879	10
51	45	864818	865960	867097	868228	869354	870473	871588	872696	873799	874897	9
		43′	58′	13′	28′	43′	58′	13′	28′	43′	58′	
52	0	9.864837	9.865979	9.867116	9.868247	9.869372	9.870492	9.871606	9.872715	9.873818	9.874915	8
53	15	864856	865998	867135	868266	869391	870510	871624	872733	873836	874934	7
54	30	864875	866017	867154	868284	869410	870529	871643	872752	873854	874952	6
55	45	864894	866036	867172	868303	869428	870548	871662	872770	873873	874970	5
		44′	59′	14′	29′	44′	59′	14′	29′	44′	59′	
56	0	9.864913	9.866055	9.867191	9.868322	9.869447	9.870566	9.871680	9.872788	9.873891	9.874988	4
57	15	864932	866074	867210	868341	869466	870585	871699	872807	873909	875007	3
58	30	864952	866093	867229	868360	869484	870604	871717	872825	873928	875025	2
59	45	864971	866112	867248	868378	869503	870622	871736	872844	873946	875043	1
60	0	9.864990	9.866131	9.867267	9.868397	9.869522	9.870641	9.871754	9.872862	9.873964	9.875061	0
sec.		9m	8m	7m	6m	5m	4m	3m	2m	1m	0m	sec.

8 Hours. Log. Haversines. 8 Hours.

sec.	0m	1m	2m	3m	4m	5m	6m	7m	8m	9m	sec.
	120 deg.				121 deg.				122 deg.		
	0′	15′	30′	45′	0′	15′	30′	45′	0′	15′	
0	0 9.875061	9.876153	9.877238	9.878319	9.879394	9.880463	9.881527	9.882585	9.883639	9.884686	60
1	15 875079	876171	877256	878337	879411	880481	881545	882603	883656	884704	59
2	30 875098	876189	877274	878355	879429	880498	881562	882621	883674	884721	58
3	45 875116	876207	877292	878373	879447	880516	881580	882638	883691	884738	57
	1′	16′	31′	46′	1′	16′	31′	46′	1′	16′	
4	0 9.875134	9.876225	9.877311	9.878391	9.879465	9.880534	9.881598	9.882656	9.883709	9.884756	56
5	15 875152	876243	877329	878408	879483	880552	881615	882673	883726	884773	55
6	30 875171	876261	877347	878426	879501	880570	881633	882691	883744	884791	54
7	45 875189	876280	877365	878444	879519	880587	881651	882709	883761	884808	53
	2′	17′	32′	47′	2′	17′	32′	47′	2′	17′	
8	0 9.875207	9.876298	9.877383	9.878462	9.879536	9.880605	9.881668	9.882726	9.883779	9.884826	52
9	15 875225	876316	877401	878480	879554	880623	881686	882744	883796	884843	51
10	30 875244	876334	877419	878498	879572	880641	881704	882761	883814	884860	50
11	45 875262	876352	877437	878516	879590	880658	881721	882779	883831	884878	49
	3′	18′	33′	48′	3′	18′	33′	48′	3′	18′	
12	0 9.875280	9.876370	9.877455	9.878534	9.879608	9.880676	9.881739	9.882796	9.883848	9.884895	48
13	15 875298	876388	877473	878552	879626	880694	881757	882814	883866	884912	47
14	30 875316	876406	877491	878570	879644	880711	881774	882832	883883	884930	46
15	45 875335	876425	877509	878588	879661	880729	881792	882849	883901	884947	45
	4′	19′	34′	49′	4′	19′	34′	49′	4′	19′	
16	0 9.875353	9.876443	9.877527	9.878606	9.879679	9.880747	9.881810	9.882867	9.883918	9.884965	44
17	15 875371	876461	877545	878624	879697	880765	881827	882885	883936	884982	43
18	30 875389	876479	877563	878642	879715	880783	881845	882902	883953	884999	42
19	45 875407	876497	877581	878660	879733	880800	881863	882919	883971	885017	41
	5′	20′	35′	50′	5′	20′	35′	50′	5′	20′	
20	0 9.875426	9.876515	9.877599	9.878678	9.879751	9.880318	9.881880	9.882937	9.883988	9.885034	40
21	15 875444	876533	877617	878696	879768	880836	881898	882955	884006	885052	39
22	30 875462	876551	877635	878713	879786	880854	881916	882972	884023	885069	38
23	45 875480	876569	877653	878731	879804	880871	881933	882990	884041	885086	37
	6′	21′	36′	51′	6′	21′	36′	51′	6′	21′	
24	0 9.875498	9.876588	9.877671	9.878749	9.879822	9.880889	9.881951	9.883007	9.884058	9.885104	36
25	15 875517	876606	877689	878767	879840	880907	881969	883023	884076	885121	35
26	30 875535	876624	877707	878785	879858	880925	881986	883042	884093	885139	34
27	45 875553	876642	877725	878803	879875	880942	882004	883060	884111	885156	33
	7′	22′	37′	52′	7′	22′	37′	52′	7′	22′	
28	0 9.875571	9.876660	9.877743	9.878821	9.879893	9.880960	9.882022	9.883078	9.884128	9.885173	32
29	15 875589	876678	877761	878839	879911	880978	882039	883095	884146	885191	31
30	30 875608	876696	877779	878857	879929	880996	882057	883113	884163	885208	30
31	45 875626	876714	877797	878875	879947	881014	882074	883130	884180	885225	29
	8′	23′	38′	53′	8′	23′	38′	53′	8′	23′	
32	0 9.875644	9.876732	9.877815	9.878893	9.879965	9.881031	9.882092	9.883148	9.884198	9.885243	28
33	15 875662	876750	877833	878911	879982	881049	882110	883165	884216	885260	27
34	30 875680	876769	877851	878928	880000	881067	882127	883183	884233	885278	26
35	45 875698	876787	877869	878946	880018	881084	882145	883200	884250	885295	25
	9′	24′	39′	54′	9′	24′	39′	54′	9′	24′	
36	0 9.875717	9.876805	9.877887	9.878964	9.880036	9.881102	9.882163	9.883218	9.884268	9.885312	24
37	15 875735	876823	877905	878982	880054	881120	882180	883235	884285	885330	23
38	30 875753	876841	877923	879000	880071	881137	882198	883253	884303	885347	22
39	45 875771	876859	877941	879018	880089	881155	882216	883271	884320	885364	21
	10′	25′	40′	55′	10′	25′	40′	55′	10′	25′	
40	0 9.875789	9.876877	9.877959	9.879036	9.880107	9.881173	9.882233	9.883288	9.884338	9.885382	20
41	15 875808	876895	877977	879054	880125	881191	882251	883306	884355	885399	19
42	30 875826	876913	877995	879072	880143	881208	882268	883323	884372	885416	18
43	45 875844	876931	878013	879090	880160	881226	882286	883341	884390	885434	17
	11′	26′	41′	56′	11′	26′	41′	56′	11′	26′	
44	0 9.875862	9.876949	9.878031	9.879107	9.880178	9.881244	9.882303	9.883358	9.884407	9.885451	16
45	15 875880	876967	878049	879125	880196	881261	882321	883376	884425	885468	15
46	30 875898	876986	878067	879143	880214	881279	882339	883393	884442	885486	14
47	45 875917	877004	878085	879161	880232	881297	882357	883411	884460	885503	13
	12′	27′	42′	57′	12′	27′	42′	57′	12′	27′	
48	0 9.875935	9.877022	9.878103	9.879179	9.880250	9.881315	9.882374	9.883428	9.884477	9.885520	12
49	15 875953	877040	878121	879197	880267	881332	882392	883446	884495	885538	11
50	30 875971	877058	878139	879215	880285	881350	882409	883463	884512	885555	10
51	45 875989	877076	878157	879233	880303	881368	882427	883481	884529	885572	9
	13′	28′	43′	58′	13′	28′	43′	58′	13′	28′	
52	0 9.876007	9.877094	9.878175	9.879251	9.880321	9.881385	9.882445	9.883498	9.884547	9.885590	8
53	15 876026	877112	878193	879268	880338	881403	882462	883516	884564	885607	7
54	30 876044	877130	878211	879286	880356	881421	882480	883533	884582	885625	6
55	45 876062	877148	878229	879304	880374	881438	882497	883551	884599	885642	5
	14′	29′	44′	59′	14′	29′	44′	59′	14′	29′	
56	0 9.876080	9.877166	9.878247	9.879322	9.880392	9.881456	9.882515	9.883568	9.884617	9.885659	4
57	15 876098	877184	878265	879340	880410	881474	882533	883586	884634	885676	3
58	30 876116	877202	878283	879358	880427	881492	882550	883604	884651	885694	2
59	45 876134	877220	878301	879376	880445	881509	882568	883621	884669	885711	1
60	60 9.876153	9.877238	9.878319	9.879394	9.880463	9.881527	9.882585	9.883639	9.884686	9.885729	0
sec.	59m	58m	57m	56m	55m	54m	53m	52m	51m	50m	sec.

15 Hours. 15 Hours.

8 Hours.	Log. Haversines.								8 Hours.
	10m	11m	12m	13m	14m	15m	16m	17m	18m	19m	
	122 deg.		123 deg.				124 deg.				
sec.											sec.
	′30′	45′	0′	15′	30′	45′	0′	15′	30′	45′	
0	0 9.885729	9.886765	9.887797	9.888823	9.889844	9.890860	9.891870	9.892875	9.893874	9.894869	60
1	15 885746	886783	887814	888840	889861	890876	891887	892891	893891	894885	59
2	30 885763	886800	887831	888857	889878	890893	891903	892908	893908	894902	58
3	45 885780	886817	887848	888874	889895	890910	891920	892925	893924	894918	57
	31′	46′	1′	16′	31′	46′	1′	16′	31′	46′	
4	0 9.885798	9.886834	9.887866	9.888891	9.889912	9.890927	9.891937	9.892942	9.893941	9.894935	56
5	15 885815	886852	887883	888908	889929	890944	891954	892958	893957	894951	55
6	30 885832	886869	887900	888926	889946	890961	891971	892975	893974	894968	54
7	45 885850	886886	887917	888943	889963	890978	891987	892992	893991	894984	53
	32′	47′	2′	17′	32′	47′	2′	17′	32′	47′	
8	0 9.885867	9.886903	9.887934	9.888960	9.889980	9.890995	9.892004	9.893008	9.894007	9.895001	52
9	15 885884	886920	887951	888977	889997	891011	892021	893025	894024	895017	51
10	30 885902	886938	887968	888994	890014	891028	892038	893042	894040	895034	50
11	45 885919	886955	887985	889011	890031	891045	892054	893058	894057	895050	49
	33′	48′	3′	18′	33′	48′	3′	18′	33′	48′	
12	0 9.885936	9.886972	9.888003	9.889028	9.890048	9.891062	9.892071	9.893075	9.894074	9.895067	48
13	15 885954	886989	888020	889045	890065	891079	892088	893092	894090	895083	47
14	30 885971	887007	888037	889062	890082	891096	892105	893108	894107	895100	46
15	45 885988	887024	888054	889079	890098	891113	892121	893125	894123	895116	45
	34′	49′	4′	19′	34′	49′	4′	19′	34′	49′	
16	0 9.886006	9.887041	9.888071	9.889096	9.890115	9.891130	9.892138	9.893142	9.894140	9.895133	44
17	15 886023	887058	888088	889113	890132	891146	892155	893158	894157	895149	43
18	30 886040	887075	888105	889130	890149	891163	892172	893175	894173	895166	42
19	45 886058	887093	888122	889147	890166	891180	892189	893192	894190	895182	41
	35′	50′	5′	20′	35′	50′	5′	20′	35′	50′	
20	0 9.886075	9.887110	9.888140	9.889164	9.890183	9.891197	9.892205	9.893209	9.894206	9.895199	40
21	15 886092	887127	888157	889181	890200	891214	892222	893225	894223	895215	39
22	30 886109	887144	888174	889198	890217	891231	892239	893242	894240	895232	38
23	45 886127	887161	888191	889215	890234	891247	892256	893259	894256	895248	37
	36′	51′	6′	21′	36′	51′	6′	21′	36′	51′	
24	0 9.886144	9.887179	9.888208	9.889232	9.890251	9.891264	9.892272	9.893275	9.894273	9.895265	36
25	15 886161	887196	888225	889249	890268	891281	892289	893292	894289	895281	35
26	30 886179	887213	888242	889266	890285	891298	892306	893309	894306	895298	34
27	45 886196	887230	888259	889283	890302	891315	892323	893325	894322	895314	33
	37′	52′	7′	22′	37′	52′	7′	22′	37′	52′	
28	0 9.886213	9.887248	9.888277	9.889300	9.890319	9.891332	9.892339	9.893342	9.894339	9.895331	32
29	15 886230	887265	888294	889317	890336	891348	892356	893359	894356	895347	31
30	30 886248	887282	888311	889334	890353	891365	892373	893375	894372	895364	30
31	45 886265	887299	888328	889351	890369	891382	892390	893392	894389	895380	29
	38′	53′	8′	23′	38′	53′	8′	23′	38′	53′	
32	0 9.886282	9.887316	9.888345	9.889368	9.890386	9.891399	9.892406	9.893409	9.894405	9.895397	28
33	15 886299	887333	888362	889385	890403	891416	892423	893425	894422	895414	27
34	30 886317	887351	888379	889402	890420	891433	892440	893442	894439	895430	26
35	45 886334	887368	888396	889419	890437	891449	892457	893458	894455	895446	25
	39′	54′	9′	24′	39′	54′	9′	24′	39′	54′	
36	0 9.886351	9.887385	9.888413	9.889436	9.890454	9.891466	9.892473	9.893475	9.894472	9.895463	24
37	15 886369	887402	888430	889453	890471	891483	892490	893492	894488	895479	23
38	30 886386	887419	888448	889470	890488	891500	892507	893508	894505	895496	22
39	45 886403	887437	888465	889487	890505	891517	892524	893525	894521	895512	21
	40′	55′	10′	25′	40′	55′	10′	25′	40′	55′	
40	0 9.886420	9.887454	9.888482	9.889504	9.890522	9.891534	9.892540	9.893542	9.894538	9.895529	20
41	15 886438	887471	888499	889521	890539	891550	892557	893559	894554	895545	19
42	30 886455	887488	888516	889538	890556	891567	892574	893575	894571	895562	18
43	45 886472	887505	888533	889555	890572	891584	892591	893592	894587	895578	17
	41′	56′	11′	26′	41′	56′	11′	26′	41′	56′	
44	0 9.886489	9.887522	9.888550	9.889572	9.890589	9.891601	9.892607	9.893608	9.894604	9.895595	16
45	15 886507	887540	888567	889589	890606	891618	892624	893625	894621	895611	15
46	30 886524	887557	888584	889606	890623	891635	892641	893642	894637	895628	14
47	45 886541	887574	888601	889623	890640	891651	892657	893658	894654	895644	13
	42′	57′	12′	27′	42′	57′	12′	27′	42′	57′	
48	0 9.886558	9.887591	9.888618	9.889640	9.890657	9.891668	9.892674	9.893675	9.894670	9.895660	12
49	15 886576	887608	888635	889657	890674	891685	892691	893691	894687	895677	11
50	30 886593	887625	888653	889674	890691	891702	892708	893708	894703	895693	10
51	45 886610	887643	888670	889691	890708	891719	892724	893725	894720	895710	9
	43′	58′	13′	28′	43′	58′	13′	28′	43′	58′	
52	0 9.886628	9.887660	9.888687	9.889708	9.890725	9.891735	9.892741	9.893741	9.894736	9.895726	8
53	15 886645	887677	888704	889725	890741	891752	892758	893758	894753	895743	7
54	30 886662	887694	888721	889742	890758	891769	892775	893775	894770	895759	6
55	45 886679	887711	888738	889759	890775	891786	892791	893791	894786	895776	5
	44′	59′	14′	29′	44′	59′	14′	29′	44′	59′	
56	0 9.886696	9.887728	9.888755	9.889776	9.890792	9.891803	9.892808	9.893808	9.894803	9.895792	4
57	15 886714	887746	888772	889793	890809	891819	892825	893824	894819	895808	3
58	30 886731	887763	888789	889810	890826	891836	892841	893841	894836	895825	2
59	45 886748	887780	888806	889827	890843	891853	892858	893858	894852	895841	1
60	60 9.886765	9.887797	9.888823	9.889844	9.890860	9.891870	9.892875	9.893874	9.894869	9.895858	0
sec.	49m	48m	47m	46m	45m	44m	43m	42m	41m	40m	sec.

15 Hours. 15 Hours.

8 Hours.	Log. Haversines.								8 Hours.	
	20m	21m	22m	23m	24m	25m	26m	27m	28m	29m
	125 deg.				126 deg.				127 deg.	
sec.	′	0′	15′	30′	45′	0′	15′	30′	45′	0′	15′	sec.
0	0	9.895858	9.896842	9.897820	9.898794	9.899762	9.900725	9.901682	9.902635	9.903582	9.904525	60
1	15	895874	896858	897836	898810	899778	900741	901698	902651	903598	904540	59
2	30	895891	896874	897853	898826	899794	900757	901714	902667	903614	904556	58
3	45	895907	896891	897869	898842	899810	900773	901730	902682	903630	904572	57
		1′	16′	31′	46′	1′	16′	31′	46′	1′	16′	
4	0	9.895924	9.896907	9.897885	9.898858	9.899826	9.900789	9.901746	9.902698	9.903645	9.904587	56
5	15	895940	896923	897901	898874	899842	900805	901762	902714	903661	904603	55
6	30	895956	896940	897918	898891	899858	900821	901778	902730	903677	904619	54
7	45	895973	896956	897934	898907	899874	900837	901794	902746	903693	904634	53
		2′	17′	32′	47′	2′	17′	32′	47′	2′	17′	
8	0	9.895989	9.896972	9.897950	9.898923	9.899890	9.900853	9.901810	9.902762	9.903708	9.904650	52
9	15	896006	896989	897967	898939	899906	900869	901826	902778	903724	904665	51
10	30	896022	897005	897983	898955	899923	900885	901842	902793	903740	904681	50
11	45	896039	897021	897999	898971	899939	900901	901857	902809	903755	904697	49
		3′	18′	33′	48′	3′	18′	33′	48′	3′	18′	
12	0	9.896055	9.897038	9.898015	9.898988	9.899955	9.900917	9.901873	9.902825	9.903771	9.904712	48
13	15	896071	897054	898032	899004	899971	900933	901889	902841	903787	904728	47
14	30	896088	897070	898048	899020	899987	900949	901905	902857	903803	904744	46
15	45	896104	897087	898064	899036	900003	900965	901921	902872	903818	904760	45
		4′	19′	34′	49′	4′	19′	34′	49′	4′	19′	
16	0	9.896121	9.897103	9.898080	9.899052	9.900019	9.900981	9.901937	9.902888	9.903834	9.904775	44
17	15	896137	897119	898097	899068	900035	900997	901953	902904	903850	904791	43
18	30	896154	897136	898113	899085	900051	901013	901969	902920	903866	904806	42
19	45	896170	897152	898129	899101	900067	901028	901985	902935	903881	904822	41
		5′	20′	35′	50′	5′	20′	35′	50′	5′	20′	
20	0	9.896186	9.897168	9.898145	9.899117	9.900083	9.901045	9.902001	9.902951	9.903897	9.904838	40
21	15	896203	897185	898161	899133	900099	901060	902016	902967	903913	904853	39
22	30	896219	897201	898178	899149	900115	901076	902032	902983	903928	904869	38
23	45	896236	897217	898194	899165	900131	901092	902048	902999	903944	904884	37
		6′	21′	36′	51′	6′	21′	36′	51′	6′	21′	
24	0	9.896252	9.897234	9.898210	9.899182	9.900148	9.901108	9.902064	9.903015	9.903960	9.904900	36
25	15	896268	897250	898226	899198	900164	901124	902080	903030	903976	904916	35
26	30	896285	897266	898243	899214	900180	901140	902096	903046	903991	904931	34
27	45	896301	897283	898259	899230	900196	901156	902112	903062	904007	904947	33
		7′	22′	37′	52′	7′	22′	37′	52′	7′	22′	
28	0	9.896318	9.897299	9.898275	9.899246	9.900212	9.901172	9.902128	9.903078	9.904023	9.904963	32
29	15	896334	897316	898291	899262	900228	901188	902144	903094	904038	904978	31
30	30	896350	897332	898308	899278	900244	901204	902159	903109	904054	904994	30
31	45	896367	897348	898324	899294	900260	901220	902175	903125	904070	905009	29
		8′	23′	38′	53′	8′	23′	38′	53′	8′	23′	
32	0	9.896383	9.897364	9.898340	9.899311	9.900276	9.901236	9.902191	9.903141	9.904086	9.905025	28
33	15	896400	897380	898356	899327	900292	901252	902207	903157	904101	905041	27
34	30	896416	897397	898372	899343	900308	901268	902223	903172	904117	905056	26
35	45	896432	897413	898389	899359	900324	901284	902239	903188	904133	905072	25
		9′	24′	39′	54′	9′	24′	39′	54′	9′	24′	
36	0	9.896449	9.897429	9.898405	9.899375	9.900340	9.901300	9.902255	9.903204	9.904148	9.905087	24
37	15	896465	897446	898421	899391	900356	901316	902270	903220	904164	905103	23
38	30	896482	897462	898437	899407	900372	901332	902286	903236	904180	905119	22
39	45	896498	897478	898453	899423	900388	901348	902302	903251	904195	905134	21
		10′	25′	40′	55′	10′	25′	40′	55′	10′	25′	
40	0	9.896514	9.897495	9.898470	9.899440	9.900404	9.901364	9.902318	9.903267	9.904211	9.905150	20
41	15	896531	897511	898486	899456	900420	901380	902334	903283	904227	905165	19
42	30	896547	897527	898502	899472	900436	901396	902350	903299	904242	905181	18
43	45	896563	897543	898518	899488	900452	901412	902366	903314	904258	905197	17
		11′	26′	41′	56′	11′	26′	41′	56′	11′	26′	
44	0	9.896580	9.897560	9.898535	9.899504	9.900468	9.901428	9.902382	9.903330	9.904274	9.905212	16
45	15	896596	897576	898551	899520	900484	901443	902398	903346	904289	905228	15
46	30	896613	897592	898567	899536	900500	901459	902413	903362	904305	905243	14
47	45	896629	897609	898583	899552	900516	901475	902429	903378	904321	905259	13
		12′	27′	42′	57′	12′	27′	42′	57′	12′	27′	
48	0	9.896645	9.897625	9.898599	9.899569	9.900532	9.901491	9.902445	9.903393	9.904337	9.905275	12
49	15	896662	897641	898615	899585	900548	901507	902461	903409	904352	905290	11
50	30	896678	897658	898632	899601	900565	901523	902477	903425	904368	905306	10
51	45	896694	897674	898648	899617	900581	901539	902492	903441	904384	905321	9
		13′	28′	43′	58′	13′	28′	43′	58′	13′	28′	
52	0	9.896711	9.897690	9.898664	9.899633	9.900597	9.901555	9.902508	9.903456	9.904399	9.905337	8
53	15	896727	897706	898680	899649	900613	901571	902524	903472	904415	905353	7
54	30	896744	897723	898697	899665	900629	901587	902540	903488	904431	905368	6
55	45	896760	897739	898713	899681	900645	901603	902556	903504	904446	905384	5
		14′	29′	44′	59′	14′	29′	44′	59′	14′	29′	
56	0	9.896776	9.897755	9.898729	9.899697	9.900661	9.901619	9.902572	9.903519	9.904462	9.905399	4
57	15	896793	897771	898745	899713	900677	901635	902587	903535	904478	905414	3
58	30	896809	897788	898761	899730	900693	901651	902603	903551	904493	905430	2
59	45	896825	897804	898777	899746	900709	901666	902619	903567	904509	905446	1
60	60	9.896842	9.897820	9.898794	9.899762	9.900725	9.901682	9.902635	9.903582	9.904525	9.905462	0
sec.		39m	38m	37m	36m	35m	34m	33m	32m	31m	30m	sec.

8 Hours. Log. Haversines. 8 Hours.

sec.	30m	31m	32m	33m	34m	35m	36m	37m	38m	39m	sec.
	127 deg.		128 deg.				129 deg.				
	″ 30′	45′	0′	15′	30′	45′	0′	15′	30′	45′	
0	0 9.905462	9.906394	9.907320	9.908242	9.909159	9.910070	9.910976	9.911878	9.912774	9.913665	60
1	15 905477	906409	907336	908257	909174	910085	910992	911893	912789	913680	59
2	30 905493	906425	907351	908273	909189	910100	911007	911908	912804	913695	58
3	45 905508	906440	907367	908288	909204	910116	911022	911923	912819	913710	57
	31′	46′	1′	16′	31′	46′	1′	16′	31′	46′	
4	0 9.905524	9.906456	9.907382	9.908303	9.909220	9.910131	9.911037	9.911938	9.912834	9.913725	56
5	15 905539	906471	907397	908319	909235	910146	911052	911953	912849	913739	55
6	30 905555	906486	907413	908334	909250	910161	911067	911968	912863	913754	54
7	45 905571	906502	907428	908349	909265	910176	911082	911983	912878	913769	53
	32′	47′	2′	17′	32′	47′	2′	17′	32′	47′	
8	0 9.905586	9.906517	9.907444	9.908365	9.909280	9.910191	9.911097	9.911998	9.912893	9.913784	52
9	15 905602	906533	907459	908380	909296	910206	911112	912013	912908	913798	51
10	30 905617	906548	907474	908395	909311	910222	911127	912028	912923	913813	50
11	45 905633	906564	907490	908410	909326	910237	911142	912043	912938	913828	49
	33′	48′	3′	18′	33′	48′	3′	18′	33′	48′	
12	0 9.905648	9.906579	9.907505	9.908426	9.909341	9.910252	9.911157	9.912057	9.912953	9.913843	48
13	15 905664	906595	907520	908441	909357	910267	911172	912072	912968	913858	47
14	30 905680	906610	907536	908456	909372	910282	911187	912087	912982	913872	46
15	45 905695	906626	907551	908472	909387	910297	911202	912102	912997	913887	45
	34′	49′	4′	19′	34′	49′	4′	19′	34′	49′	
16	0 9.905711	9.906641	9.907567	9.908487	9.909402	9.910312	9.911217	9.912117	9.913012	9.913902	44
17	15 905726	906657	907582	908502	909417	910327	911232	912132	913027	913917	43
18	30 905742	906672	907597	908518	909433	910343	911247	912147	913042	913932	42
19	45 905757	906688	907613	908533	909448	910358	911262	912162	913057	913946	41
	35′	50′	5′	20′	35′	50′	5′	20′	35′	50′	
20	0 9.905773	9.906703	9.907628	9.908548	9.909463	9.910373	9.911277	9.912177	9.913072	9.913961	40
21	15 905788	906719	907644	908563	909478	910388	911293	912192	913087	913976	39
22	30 905804	906734	907659	908579	909493	910403	911308	912207	913101	913991	38
23	45 905819	906749	907674	908594	909509	910418	911323	912222	913116	914006	37
	36′	51′	6′	21′	36′	51′	6′	21′	36′	51′	
24	0 9.905835	9.906765	9.907690	9.908609	9.909524	9.910433	9.911338	9.912237	9.913131	9.914020	36
25	15 905851	906780	907705	908625	909539	910448	911353	912252	913146	914035	35
26	30 905866	906796	907720	908640	909554	910463	911368	912267	913161	914050	34
27	45 905882	906811	907736	908655	909569	910479	911383	912282	913176	914065	33
	37′	52′	7′	22′	37′	52′	7′	22′	37′	52′	
28	0 9.905897	9.906827	9.907751	9.908670	9.909585	9.910494	9.911398	9.912297	9.913191	9.914079	32
29	15 905913	906842	907766	908686	909600	910509	911413	912312	913206	914094	31
30	30 905928	906858	907782	908701	909615	910524	911428	912327	913220	914109	30
31	45 905944	906873	907797	908716	909630	910539	911443	912342	913235	914124	29
	38′	53′	8′	23′	38′	53′	8′	23′	38′	53′	
32	0 9.905959	9.906889	9.907813	9.908732	9.909645	9.910554	9.911458	9.912356	9.913250	9.914139	28
33	15 905975	906904	907828	909747	909661	910569	911473	912371	913265	914153	27
34	30 905990	906919	907843	908762	909676	910584	911488	912386	913280	914168	26
35	45 906006	906935	907859	908777	909691	910599	911503	912401	913295	914183	25
	39′	54′	9′	24′	39′	54′	9′	24′	39′	54′	
36	0 9.906021	9.906950	9.907874	9.908793	9.909706	9.910615	9.911518	9.912416	9.913309	9.914198	24
37	15 906037	906966	907889	908808	909721	910630	911533	912431	913324	914212	23
38	30 906052	906981	907905	908823	909736	910645	911548	912446	913339	914227	22
39	45 906068	906997	907920	908838	909752	910660	911563	912461	913354	914242	21
	40′	55′	10′	25′	40′	55′	10′	25′	40′	55′	
40	0 9.906084	9.907012	9.907935	9.908854	9.909767	9.910675	9.911578	9.912476	9.913369	9.914257	20
41	15 906099	907027	907951	908869	909782	910690	911593	912491	913384	914271	19
42	30 906115	907043	907966	908884	909797	910705	911608	912506	913398	914286	18
43	45 906130	907058	907981	908899	909812	910720	911623	912521	913413	914301	17
	41′	56′	11′	26′	41′	56′	11′	26′	41′	56′	
44	0 9.906146	9.907074	9.907997	9.908915	9.909828	9.910735	9.911638	9.912536	9.913428	9.914316	16
45	15 906161	907089	908012	908930	909843	910750	911653	912550	913443	914330	15
46	30 906177	907105	908027	908945	909858	910765	911668	912565	913458	914345	14
47	45 906192	907120	908043	908960	909873	910781	911683	912580	913473	914360	13
	42′	57′	12′	27′	42′	57′	12′	27′	42′	57′	
48	0 9.906208	9.907135	9.908058	9.908976	9.909888	9.910796	9.911698	9.912595	9.913487	9.914375	12
49	15 906223	907151	908073	908991	909903	910811	911713	912610	913502	914389	11
50	30 906239	907166	908089	909006	909919	910826	911728	912625	913517	914404	10
51	45 906254	907182	908104	909021	909934	910841	911743	912640	913532	914419	9
	43′	58′	13′	28′	43′	58′	13′	28′	43′	58′	
52	0 9.906270	9.907197	9.908119	9.909037	9.909949	9.910856	9.911758	9.912655	9.913547	9.914434	8
53	15 906285	907212	908135	909052	909964	910871	911773	912670	913562	914448	7
54	30 906301	907228	908150	909067	909979	910886	911788	912685	913576	914463	6
55	45 906316	907243	908165	909082	909994	910901	911803	912700	913591	914478	5
	44′	59′	14′	29′	44′	59′	14′	29′	44′	59′	
56	0 9.906332	9.907259	9.908181	9.909098	9.910009	9.910916	9.911818	9.912714	9.913606	9.914493	4
57	15 906347	907274	908196	909113	910025	910931	911833	912729	913621	914507	3
58	30 906363	907290	908211	909128	910040	910946	911848	912744	913636	914522	2
59	45 906378	907305	908227	909143	910055	910961	911863	912759	913650	914537	1
60	60 9.906394	9.907320	9.908242	9.909159	9.910070	9.910976	9.911878	9.912774	9.913665	9.914551	0
sec.	29m	28m	27m	26m	25m	24m	23m	22m	21m	20m	sec.

15 Hours. 15 Hours.

8 Hours. LOG. HAVERSINES. 8 Hours.

sec.		40m	41m	42m	43m	44m	45m	46m	47m	48m	49m	sec.
		130 deg.				131 deg.				132 deg.		
	″	0′	15′	30′	45′	0′	15′	30′	45′	0′	15′	
0	0	9.914551	9.915433	9.916309	9.917180	9.918046	9.918907	9.919763	9.920614	9.921460	9.922302	60
1	15	914566	915447	916323	917194	918060	918921	919778	920628	921474	922315	59
2	30	914581	915462	916338	917209	918075	918936	919791	920642	921488	922329	58
3	45	914596	915476	916352	917223	918089	918950	919806	920657	921502	922343	57
		1′	16′	31′	46′	1′	16′	31′	46′	1′	16′	
4	0	9.914610	9.915491	9.916367	9.917238	9.918103	9.918964	9.919820	9.920671	9.921517	9.922357	56
5	15	914625	915506	916381	917252	918118	918978	919834	920685	921531	922371	55
6	30	914640	915520	916396	917267	918132	918993	919848	920699	921545	922385	54
7	45	914654	915535	916411	917281	918146	919007	919863	920713	921559	922399	53
		2′	17′	32′	47′	2′	17′	32′	47′	2′	17′	
8	0	9.914669	9.915550	9.916425	9.917295	9.918161	9.919021	9.919877	9.920727	9.921573	9.922413	52
9	15	914684	915564	916440	917310	918175	919036	919891	920741	921587	922427	51
10	30	914699	915579	916454	917324	918190	919050	919905	920756	921601	922441	50
11	45	914713	915594	916469	917339	918204	919064	919919	920770	921615	922455	49
		3′	18′	33′	48′	3′	18′	33′	48′	3′	18′	
12	0	9.914728	9.915608	9.916483	9.917353	9.918218	9.919079	9.919934	9.920784	9.921629	9.922470	48
13	15	914743	915623	916498	917368	918233	919093	919948	920798	921643	922483	47
14	30	914757	915637	916512	917382	918247	919107	919962	920812	921657	922497	46
15	45	914772	915652	916527	917397	918262	919121	919976	920826	921671	922511	45
		4′	19′	34′	49′	4′	19′	34′	49′	4′	19′	
16	0	9.914787	9.915667	9.916541	9.917411	9.918276	9.919136	9.919990	9.920840	9.921685	9.922525	44
17	15	914802	915681	916556	917426	918290	919150	920005	920854	921699	922539	43
18	30	914816	915696	916570	917440	918305	919164	920019	920869	921713	922553	42
19	45	914831	915710	916585	917454	918319	919179	920033	920883	921727	922567	41
		5′	20′	35′	50′	5′	20′	35′	50′	5′	20′	
20	0	9.914846	9.915725	9.916600	9.917469	9.918333	9.919193	9.920047	9.920897	9.921741	9.922581	40
21	15	914860	915740	916614	917483	918348	919207	920061	920911	921755	922595	39
22	30	914875	915754	916629	917498	918362	919221	920076	920925	921769	922609	38
23	45	914889	915769	916643	917512	918376	919236	920090	920939	921783	922623	37
		6′	21′	36′	51′	6′	21′	36′	51′	6′	21′	
24	0	9.914904	9.915784	9.916658	9.917527	9.918391	9.919250	9.920104	9.920953	9.921797	9.922637	36
25	15	914919	915798	916672	917541	918405	919264	920118	920967	921811	922651	35
26	30	914934	915813	916687	917556	918420	919279	920132	920981	921825	922665	34
27	45	914949	915827	916701	917570	918434	919293	920147	920995	921839	922678	33
		7′	22′	37′	52′	7′	22′	37′	52′	7′	22′	
28	0	9.914963	9.915842	9.916716	9.917587	9.918448	9.919307	9.920161	9.921010	9.921854	9.922692	32
29	15	914978	915857	916730	917599	918463	919321	920175	921024	921867	922706	31
30	30	914993	915871	916745	917613	918477	919336	920189	921038	921882	922720	30
31	45	915007	915886	916759	917628	918491	919350	920203	921052	921896	922734	29
		8′	23′	38′	53′	8′	23′	38′	53′	8′	23′	
32	0	9.915022	9.915900	9.916774	9.917642	9.918506	9.919364	9.920218	9.921066	9.921910	9.922748	28
33	15	915037	915915	916788	917657	918520	919378	920232	921080	921924	922762	27
34	30	915051	915930	916803	917671	918534	919393	920246	921094	921938	922776	26
35	45	915066	915944	916817	917686	918549	919407	920260	921108	921952	922790	25
		9′	24′	39′	54′	9′	24′	39′	54′	9′	24′	
36	0	9.915081	9.915959	9.916832	9.917700	9.918563	9.919421	9.920274	9.921122	9.921966	9.922804	24
37	15	915095	915973	916846	917714	918577	919435	920288	921136	921980	922818	23
38	30	915110	915988	916861	917729	918592	919450	920303	921151	921994	922832	22
39	45	915125	916003	916875	917743	918606	919464	920317	921165	922008	922846	21
		10′	25′	40′	55′	10′	25′	40′	55′	10′	25′	
40	0	9.915139	9.916017	9.916890	9.917758	9.918620	9.919478	9.920331	9.921179	9.922022	9.922860	20
41	15	915154	916032	916904	917772	918635	919492	920345	921193	922036	922873	19
42	30	915169	916046	916919	917787	918649	919507	920359	921207	922050	922887	18
43	45	915183	916061	916933	917801	918663	919521	920373	921221	922064	922901	17
		11′	26′	41′	56′	11′	26′	41′	56′	11′	26′	
44	0	9.915198	9.916076	9.916948	9.917815	9.918678	9.919535	9.920388	9.921235	9.922078	9.922915	16
45	15	915213	916090	916962	917830	918692	919549	920402	921249	922092	922929	15
46	30	915227	916105	916977	917844	918706	919564	920416	921263	922106	922943	14
47	45	915242	916119	916991	917859	918720	919578	920430	921277	922120	922957	13
		12′	27′	42′	57′	12′	27′	42′	57′	12′	27′	
48	0	9.915257	9.916134	9.917006	9.917873	9.918735	9.919592	9.920444	9.921291	9.922134	9.922971	12
49	15	915271	916148	917020	917887	918749	919606	920458	921306	922148	922985	11
50	30	915286	916163	917035	917902	918764	919621	920473	921320	922162	922999	10
51	45	915301	916178	917049	917916	918778	919635	920487	921334	922176	923013	9
		13′	28′	43′	58′	13′	28′	43′	58′	13′	28′	
52	0	9.915315	9.916192	9.917064	9.917931	9.918792	9.919649	9.920501	9.921348	9.922190	9.923027	8
53	15	915330	916207	917078	917945	918807	919663	920515	921362	922204	923040	7
54	30	915345	916221	917093	917959	918821	919678	920529	921376	922218	923054	6
55	45	915359	916236	917107	917974	918835	919692	920543	921390	922232	923068	5
		14′	29′	44′	59′	14′	29′	44′	59′	14′	29′	
56	0	9.915374	9.916250	9.917122	9.917988	9.918850	9.919706	9.920558	9.921404	9.922246	9.923082	4
57	15	915389	916265	917136	918003	918864	919720	920572	921418	922260	923096	3
58	30	915403	916280	917151	918017	918878	919735	920586	921432	922274	923110	2
59	45	915418	916294	917165	918031	918893	919749	920600	921446	922287	923124	1
60	60	9.915433	9.916309	9.917180	9.918046	9.918907	9.919763	9.920614	9.921460	9.922302	9.923138	0
sec.		19m	18m	17m	16m	15m	14m	13m	12m	11m	10m	sec.

15 Hours. 15 Hours.

8 Hours.	Log. Haversines.	8 Hours.

sec.	50m	51m	52m	53m	54m	55m	56m	57m	58m	59m	sec.
	132 deg.		133 deg.				134 deg.				
	′	30′	45′	0′	15′	30′	45′	0′	15′	30′	45′	
0	0	9.923138	9.923969	9.924796	9.925617	9.926434	9.927245	9.928052	9.928854	9.929651	9.930443	60
1	15	923152	923983	924809	925631	926447	927259	928065	928867	929664	930456	59
2	30	923166	923997	924823	925644	926461	927272	928079	928881	929678	930470	58
3	45	923179	924011	924837	925658	926474	927286	928092	928894	929691	930483	57
		31′	46′	1′	16′	31′	46′	1′	16′	31′	46′	
4	0	9.923193	9.924024	9.924850	9.925672	9.926488	9.927299	9.928106	9.928907	9.929704	9.930496	56
5	15	923207	924038	924864	925685	926501	927313	928119	928921	929717	930509	55
6	30	923221	924052	924878	925699	926515	927326	928133	928934	929731	930522	54
7	45	923235	924066	924892	925713	926529	927340	928146	928947	929744	930535	53
		32′	47′	2′	17′	32′	47′	2′	17′	32′	47′	
8	0	9.923249	9.924080	9.924905	9.925726	9.926542	9.927353	9.928159	9.928961	9.929757	9.930549	52
9	15	923263	924094	924919	925740	926556	927367	928173	928974	929770	930562	51
10	30	923277	924107	924933	925754	926569	927380	928186	928987	929784	930575	50
11	45	923291	924121	924946	925767	926583	927394	928199	929000	929797	930588	49
		33′	48′	3′	18′	33′	48′	3′	18′	33′	48′	
12	0	9.923304	9.924135	9.924960	9.925781	9.926596	9.927407	9.928213	9.929014	9.929810	9.930601	48
13	15	923318	924149	924974	925794	926610	927420	928226	929027	929823	930614	47
14	30	923332	924162	924988	925808	926623	927434	928240	929041	929836	930627	46
15	45	923346	924176	925001	925822	926637	927447	928253	929054	929850	930641	45
		34′	49′	4′	19′	34′	49′	4′	19′	34′	49′	
16	0	9.923360	9.924190	9.925015	9.925835	9.926651	9.927461	9.928266	9.929067	9.929863	9.930654	44
17	15	923374	924204	925029	925849	926664	927474	928280	929080	929876	930667	43
18	30	923388	924218	925043	925863	926678	927488	928293	929094	929889	930680	42
19	45	923402	924231	925056	925876	926681	927501	928307	929107	929902	930693	41
		35′	50′	5′	20′	35′	50′	5′	20′	35′	50′	
20	0	9.923415	9.924245	9.925070	9.925890	9.926705	9.927515	9.928320	9.929120	9.929916	9.930706	40
21	15	923429	924259	925084	925903	926718	927528	928333	929134	929929	930719	39
22	30	923443	924273	925097	925917	926732	927542	928347	929147	929942	930733	38
23	45	923457	924286	925111	925931	926745	927555	928360	929160	929955	930746	37
		36′	51′	6′	21′	36′	51′	6′	21′	36′	51′	
24	0	9.923471	9.924300	9.925125	9.925944	9.926759	9.927569	9.928374	9.929174	9.929969	9.930759	36
25	15	923485	924314	925138	925958	926772	927582	928387	929187	929982	930772	35
26	30	923499	924328	925152	925972	926786	927596	928400	929200	929995	930785	34
27	45	923512	924342	925166	925985	926799	927609	928413	929213	930008	930798	33
		37′	52′	7′	22′	37′	52′	7′	22′	37′	52′	
28	0	9.923526	9.924355	9.925180	9.925999	9.926813	9.927622	9.928427	9.929227	9.930021	9.930811	32
29	15	923540	924369	925193	926012	926826	927636	928440	929240	930035	930824	31
30	30	923554	924383	925207	926026	926840	927649	928454	929253	930048	930838	30
31	45	923568	924397	925221	926039	926854	927663	928467	929266	930061	930851	29
		38′	53′	8′	23′	38′	53′	8′	23′	38′	53′	
32	0	9.923582	9.924411	9.925234	9.926053	9.926867	9.927676	9.928480	9.929280	9.930074	9.930864	28
33	15	923596	924424	925248	926067	926881	927690	928494	929294	930087	930877	27
34	30	923610	924438	925262	926080	926894	927703	928507	929306	930101	930890	26
35	45	923623	924452	925275	926094	926908	927716	928520	929320	930114	930903	25
		39′	54′	9′	24′	39′	54′	9′	24′	39′	54′	
36	0	9.923637	9.924466	9.925289	9.926108	9.926921	9.927730	9.928534	9.929333	9.930127	9.930916	24
37	15	923651	924479	925303	926121	926935	927743	928547	929346	930140	930929	23
38	30	923665	924493	925316	926135	926948	927757	928561	929359	930153	930943	22
39	45	923679	924507	925330	926148	926962	927770	928574	929373	930167	930956	21
		40′	55′	10′	25′	40′	55′	10′	25′	40′	55′	
40	0	9.923693	9.924521	9.925344	9.926162	9.926975	9.927784	9.928587	9.929386	9.930180	9.930969	20
41	15	923706	924534	925357	926176	926989	927797	928601	929399	930193	930983	19
42	30	923720	924548	925371	926189	927002	927811	928614	929413	930206	930995	18
43	45	923734	924562	925385	926203	927016	927824	928627	929426	930219	931009	17
		41′	56′	11′	26′	41′	56′	11′	26′	41′	56′	
44	0	9.923748	9.924576	9.925398	9.926216	9.927029	9.927837	9.928641	9.929439	9.930233	9.931021	16
45	15	923762	924589	925412	926230	927043	927851	928654	929452	930246	931035	15
46	30	923776	924603	925426	926244	927056	927864	928667	929466	930259	931047	14
47	45	923789	924617	925439	926257	927070	927878	928681	929479	930272	931061	13
		42′	57′	12′	27′	42′	57′	12′	27′	42′	57′	
48	0	9.923803	9.924631	9.925453	9.926271	9.927083	9.927891	9.928694	9.929492	9.930285	9.931074	12
49	15	923817	924644	925467	926284	927097	927905	928707	929505	930298	931088	11
50	30	923831	924658	925480	926298	927110	927918	928721	929519	930312	931100	10
51	45	923845	924672	925494	926311	927124	927931	928734	929532	930325	931114	9
		43′	58′	13′	28′	43′	58′	13′	28′	43′	58′	
52	0	9.923859	9.924686	9.925508	9.926325	9.927137	9.927945	9.928747	9.929544	9.930338	9.931126	8
53	15	923872	924699	925521	926339	927151	927958	928761	929559	930351	931140	7
54	30	923886	924713	925535	926352	927164	927972	928774	929572	930364	931152	6
55	45	923900	924727	925549	926366	927178	927985	928787	929585	930377	931166	5
		44′	59′	14′	29′	44′	59′	14′	29′	44′	59′	
56	0	9.923914	9.924741	9.925562	9.926379	9.927191	9.927999	9.928801	9.929598	9.930391	9.931178	4
57	15	923928	924754	925576	926393	927205	928012	928814	929612	930404	931192	3
58	30	923942	924768	925590	926407	927218	928025	928827	929625	930417	931205	2
59	45	923955	924782	925603	926420	927232	928039	928841	929639	930430	931219	1
60	60	9.923969	9.924796	9.925617	9.926434	9.927245	9.928052	9.928854	9.929651	9.930443	9.931231	0
sec.	9m	8m	7m	6m	5m	4m	3m	2m	1m	0m	sec.

15 Hours. 15 Hours.

Log. Haversines.

Time.	Arc.	9h 0m	9h 4m	9h 8m	9h 12m	9h 16m	9h 20m	9h 24m	9h 28m	9h 32m	Arc.	Time.
m s		135°	136°	137°	138°	139°	140°	141°	142°	143°		s m
0 0	0	9.931231	9.934332	9.937356	9.940303	9.943175	9.945972	9.948693	9.951340	9.953913	60	0 4
0 4	1	931283	934383	937406	940352	943223	946018	948738	951384	953955	59	56 3
0 8	2	931335	934434	937455	940400	943270	946064	948783	951427	953998	58	52 3
0 12	3	931388	934485	937505	940449	943317	946109	948827	951471	954040	57	48 3
0 16	4	9.931440	9.934536	9.937555	9.940497	9.943364	9.946155	9.948872	9.951514	9.954082	56	44 3
0 20	5	931492	934587	937604	940546	943411	946201	948917	951557	954124	55	40 3
0 24	6	931544	934638	937654	940594	943458	946247	948961	951601	954166	54	36 3
0 28	7	931596	934688	937704	940642	943505	946293	949006	951644	954209	53	32 3
0 32	8	9.931649	9.934739	9.937753	9.940691	9.943552	9.946339	9.949050	9.951687	9.954251	52	28 3
0 36	9	931701	934790	937803	940739	943600	946385	949095	951731	954293	51	24 3
0 40	10	931753	934841	937852	940787	943647	946430	949139	951774	954335	50	20 3
0 44	11	931805	934892	937902	940836	943694	946476	949184	951817	954377	49	16 3
0 48	12	9.931857	9.934943	9.937951	9.940884	9.943741	9.946522	9.949228	9.951861	9.954419	48	12 3
0 52	13	931909	934993	938001	940932	943788	946568	949273	951904	954461	47	8 3
0 56	14	931961	935044	938050	940980	943834	946613	949317	951947	954503	46	4 3
1 0	15	932013	935095	938100	941029	943881	946659	949362	951990	954545	45	0 3
1 4	16	9.932065	9.935146	9.938150	9.941077	9.943928	9.946705	9.949406	9.952033	9.954587	44	56 2
1 8	17	932117	935196	938199	941125	943975	946750	949451	952077	954629	43	52 2
1 12	18	932169	935247	938248	941173	944022	946796	949495	952120	954671	42	48 2
1 16	19	932221	935298	938297	941221	944069	946842	949539	952163	954713	41	44 2
1 20	20	9.932273	9.935348	9.938347	9.941269	9.944116	9.946887	9.949584	9.952206	9.954754	40	40 2
1 24	21	932325	935399	938396	941317	944163	946933	949628	952249	954796	39	36 2
1 28	22	932377	935449	938445	941365	944209	946978	949672	952292	954838	38	32 2
1 32	23	932429	935500	938495	941413	944256	947024	949717	952335	954880	37	28 2
1 36	24	9.932480	9.935551	9.938544	9.941461	9.944303	9.947069	9.949761	9.952378	9.954922	36	24 2
1 40	25	932532	935601	938593	941509	944350	947115	949805	952421	954964	35	20 2
1 44	26	932584	935652	938642	941557	944396	947160	949849	952464	955005	34	16 2
1 48	27	932636	935702	938692	941605	944443	947206	949893	952507	955047	33	12 2
1 52	28	9.932687	9.935753	9.938741	9.941653	9.944490	9.947251	9.949938	9.952550	9.955089	32	8 2
1 56	29	932739	935803	938790	941701	944536	947296	949982	952593	955130	31	4 2
2 0	30	932791	935853	938839	941749	944583	947342	950026	952636	955172	30	0 2
2 4	31	932843	935904	938888	941797	944629	947387	950070	952679	955214	29	56 1
2 8	32	9.932894	9.935954	9.938937	9.941845	9.944676	9.947432	9.950114	9.952722	9.955255	28	52 1
2 12	33	932946	936004	938986	941892	944723	947478	950158	952764	955297	27	48 1
2 16	34	932997	936055	939035	941940	944769	947523	950202	952807	955339	26	44 1
2 20	35	933049	936105	939085	941988	944816	947568	950246	952850	955380	25	40 1
2 24	36	9.933101	9.936155	9.939134	9.942036	9.944862	9.947613	9.950290	9.952893	9.955422	24	36 1
2 28	37	933152	936206	939183	942083	944909	947659	950334	952936	955463	23	32 1
2 32	38	933204	936256	939232	942131	944955	947704	950378	952978	955504	22	28 1
2 36	39	933255	936306	939280	942179	945001	947749	950422	953021	955546	21	24 1
2 40	40	9.933307	9.936356	9.939329	9.942226	9.945048	9.947794	9.950466	9.953064	9.955588	20	20 1
2 44	41	933358	936406	939378	942274	945094	947839	950510	953106	955629	19	16 1
2 48	42	933410	936457	939427	942322	945141	947884	950554	953149	955671	18	12 1
2 52	43	933461	936507	939476	942369	945187	947930	950598	953192	955712	17	8 1
2 56	44	9.933512	9.936557	9.939525	9.942417	9.945233	9.947975	9.950642	9.953234	9.955753	16	4 1
3 0	45	933564	936607	939574	942464	945280	948020	950685	953277	955795	15	0 1
3 4	46	933615	936657	939622	942512	945326	948065	950729	953319	955836	14	56 0
3 8	47	933666	936707	939671	942559	945372	948110	950773	953362	955877	13	52 0
3 12	48	9.933718	9.936757	9.939720	9.942607	9.945418	9.948155	9.950817	9.953404	9.955919	12	48 0
3 16	49	933769	936807	939769	942654	945465	948200	950860	953447	955960	11	44 0
3 20	50	933820	936857	939817	942702	945511	948245	950904	953489	956001	10	40 0
3 24	51	933871	936907	939866	942749	945557	948290	950948	953532	956042	9	36 0
3 28	52	9.933923	9.936957	9.939915	9.942797	9.945603	9.948335	9.950991	9.953574	9.956084	8	32 0
3 32	53	933974	937007	939964	942844	945649	948379	951035	953617	956125	7	28 0
3 36	54	934025	937057	940012	942891	945695	948424	951079	953659	956166	6	24 0
3 40	55	934076	937107	940061	942939	945741	948469	951122	953702	956207	5	20 0
3 44	56	9.934127	9.937157	9.940109	9.942986	9.945788	9.948514	9.951166	9.953744	9.956248	4	16 0
3 48	57	934179	937206	940158	943033	945834	948559	951210	953786	956289	3	12 0
3 52	58	934230	937256	940206	943081	945880	948604	951253	953829	956331	2	8 0
3 56	59	934281	937306	940255	943128	945926	948648	951297	953871	956372	1	4 0
4 0	60	9.934332	9.937356	9.940303	9.943175	9.945972	9.948693	9.951340	9.953913	9.956413	0	0 0
m s												s m
Time.	Arc.	224°	223°	222°	221°	220°	219°	218°	217°	216°	Arc.	Time.
		14h 56m	14h 52m	14h 48m	14h 44m	14h 40m	14h 36m	14h 32m	14h 28m	14h 24m		

Log. Haversines.

Time.	Arc.	9h 36m	9h 40m	9h 44m	9h 48m	9h 52m	9h 56m	10h 0m	10h 4m	10h 8m	Arc.	Time.
m s	′	144°	145°	146°	147°	148°	149°	150°	151°	152°		s m
0 0	0	9.956413	9.958839	9.961193	9.963474	9.965683	9.967821	9.969887	9.971883	9.973805	60	0 4
0 4	1	956454	958879	961231	963511	965719	967856	969921	971916	973840	59	56 3
0 8	2	956495	958919	961270	963549	965756	967891	969955	971948	973871	58	52 3
0 12	3	956536	958958	961308	963586	965792	967926	969989	971981	973903	57	48 3
0 16	4	9.956577	9.958998	9.961347	9.963623	9.965828	9.967961	9.970023	9.972014	9.973934	56	44 3
0 20	5	956618	959038	961385	963661	965864	967996	970057	972046	973965	55	40 3
0 24	6	956659	959078	961424	963698	965900	968031	970090	972079	973997	54	36 3
0 28	7	956699	959117	961463	963735	965936	968066	970124	972111	974028	53	32 3
0 32	8	9.956740	9.959157	9.961501	9.963773	9.965972	9.968101	9.970158	9.972144	9.974060	52	28 3
0 36	9	956781	959197	961539	963810	966008	968136	970191	972176	974091	51	24 3
0 40	10	956822	959236	961578	963847	966045	968170	970225	972209	974122	50	20 3
0 44	11	956863	959276	961616	963884	966081	968205	970259	972241	974154	49	16 3
0 48	12	9.956904	9.959316	9.961655	9.963922	9.966117	9.968240	9.970292	9.972274	9.974185	48	12 3
0 52	13	956945	959355	961693	963959	966153	968275	970326	972306	974216	47	8 3
0 56	14	956985	959395	961731	963996	966188	968310	970360	972339	974247	46	4 3
1 0	15	957026	959434	961770	964033	966224	968344	970393	972371	974279	45	0 3
1 4	16	9.957067	9.959474	9.961808	9.964070	9.966260	9.968379	9.970427	9.972403	9.974310	44	56 2
1 8	17	957108	959513	961846	964107	966296	968414	970460	972436	974341	43	52 2
1 12	18	957148	959553	961885	964144	966332	968448	970493	972468	974372	42	48 2
1 16	19	957189	959592	961923	964181	966368	968483	970527	972500	974403	41	44 2
1 20	20	9.957230	9.959632	9.961961	9.964218	9.966404	9.968518	9.970561	9.972533	9.974434	40	40 2
1 24	21	957270	959671	961999	964255	966440	968552	970594	972565	974465	39	36 2
1 28	22	957311	959710	962037	964292	966475	968587	970628	972597	974496	38	32 2
1 32	23	957351	959750	962076	964329	966511	968622	970661	972629	974528	37	28 2
1 36	24	9.957392	9.959789	9.962114	9.964366	9.966547	9.968656	9.970694	9.972662	9.974559	36	24 2
1 40	25	957432	959828	962152	964403	966583	968691	970728	972694	974590	35	20 2
1 44	26	957473	959868	962190	964440	966618	968725	970761	972726	974621	34	16 2
1 48	27	957514	959907	962228	964477	966654	968760	970794	972758	974652	33	12 2
1 52	28	9.957554	9.959946	9.962266	9.964514	9.966690	9.968794	9.970828	9.972790	9.974683	32	8 2
1 56	29	957594	959986	962304	964551	966725	968829	970861	972822	974713	31	4 2
2 0	30	957635	960025	962342	964588	966761	968863	970894	972855	974744	30	0 2
2 4	31	957675	960064	962380	964624	966797	968898	970927	972887	974775	29	56 1
2 8	32	9.957716	9.960103	9.962418	9.964661	9.966832	9.968932	9.970961	9.972919	9.974806	28	52 1
2 12	33	957756	960142	962456	964698	966868	968966	970994	972951	974837	27	48 1
2 16	34	957797	960182	962494	964735	966903	969001	971027	972983	974868	26	44 1
2 20	35	957837	960221	962532	964771	966939	969035	971060	973015	974899	25	40 1
2 24	36	9.957877	9.960260	9.962570	9.964808	9.966974	9.969069	9.971093	9.973047	9.974930	24	36 1
2 28	37	957918	960299	962608	964845	967010	969104	971127	973079	974960	23	32 1
2 32	38	957958	960338	962646	964882	967045	969138	971160	973111	974991	22	28 1
2 36	39	957998	960377	962684	964918	967081	969172	971193	973142	975022	21	24 1
2 40	40	9.958038	9.960416	9.962722	9.964955	9.967116	9.969207	9.971226	9.973174	9.975053	20	20 1
2 44	41	958079	960455	962759	964991	967152	969241	971259	973206	975083	19	16 1
2 48	42	958119	960494	962797	965028	967187	969275	971292	973238	975114	18	12 1
2 52	43	958159	960533	962835	965065	967223	969309	971325	973270	975145	17	8 1
2 56	44	9.958199	9.960572	9.962873	9.965101	9.967258	9.969343	9.971358	9.973302	9.975175	16	4 1
3 0	45	958239	960611	962910	965138	967293	969378	971391	973334	975206	15	0 1
3 4	46	958279	960650	962948	965174	967329	969412	971424	973365	975237	14	56 0
3 8	47	958319	960689	962986	965211	967364	969446	971457	973397	975267	13	52 0
3 12	48	9.958360	9.960728	9.963023	9.965247	9.967399	9.969480	9.971490	9.973429	9.975298	12	48 0
3 16	49	958400	960767	963061	965284	967434	969514	971523	973461	975328	11	44 0
3 20	50	958440	960805	963099	965320	967470	969548	971555	973492	975359	10	40 0
3 24	51	958480	960844	963136	965356	967505	969582	971588	973524	975389	9	36 0
3 28	52	9.958520	9.960883	9.963174	9.965393	9.967540	9.969616	9.971621	9.973556	9.975420	8	32 0
3 32	53	958560	960922	963211	965429	967575	969650	971654	973587	975450	7	28 0
3 36	54	958600	960961	963249	965466	967610	969684	971687	973619	975481	6	24 0
3 40	55	958640	960999	963287	965502	967646	969718	971720	973651	975511	5	20 0
3 44	56	9.958680	9.961038	9.963324	9.965538	9.967681	9.969752	9.971752	9.973682	9.975542	4	16 0
3 48	57	958719	961077	963362	965575	967716	969786	971785	973714	975572	3	12 0
3 52	58	958759	961115	963399	965611	967751	969820	971818	973745	975602	2	8 0
3 56	59	958799	961154	963436	965647	967786	969854	971851	973777	975633	1	4 0
4 0	60	9.958839	9.961193	9.963474	9.965683	9.967821	9.969887	9.971883	9.973808	9.975663	0	0 0
m s Time.	Arc.	215°	214°	213°	212°	211°	210°	209°	208°	207°	Arc.	s m Time.
		14h 20m	14h 16m	14h 12m	14h 8m	14h 4m	14h 0m	13h 56m	13h 52m	13h 48m		

Log. Haversines.

Time.	Arc.	10h 12m	10h 16m	10h 20m	10h 24m	10h 28m	10h 32m	10h 36m	10h 40m	10h 44m	Arc.	Time.
		153°	154°	155°	156°	157°	158°	159°	160°	161°		
m s	° ′										° ′	s m
0 0	0	9.975663	9.977448	9.979163	9.980809	9.982385	9.983893	9.985332	9.986703	9.988005	60	0 4
0 4	1	975693	977477	979191	980836	982411	983918	985356	986725	988027	59	56 3
0 8	2	975724	977506	979219	980862	982437	983942	985379	986747	988048	58	52 3
0 12	3	975754	977535	979247	980889	982462	983967	985402	986770	988069	57	48 3
0 16	4	9.975784	9.977564	9.979275	9.980916	9.982488	9.983991	9.985426	9.986792	9.988090	56	44 3
0 20	5	975814	977593	979303	980943	982514	984016	985449	986814	988111	55	40 3
0 24	6	975845	977623	979331	980970	982539	984040	985472	986836	988132	54	36 3
0 28	7	975875	977652	979359	980996	982565	984065	985496	986858	988153	53	32 3
0 32	8	9.975905	9.977681	9.979386	9.981023	9.982590	9.984089	9.985519	9.986881	9.988174	52	28 3
0 36	9	975935	977710	979414	981050	982616	984113	985542	986903	988195	51	24 3
0 40	10	975965	977739	979442	981076	982641	984138	985565	986925	988216	50	20 3
0 44	11	975995	977768	979470	981103	982667	984162	985589	986947	988237	49	16 3
0 48	12	9.976026	9.977796	9.979498	9.981130	9.982692	9.984186	9.985612	9.986969	9.988258	48	12 3
0 52	13	976056	977825	979525	981156	982718	984211	985635	986991	988279	47	8 3
0 56	14	976086	977854	979553	981183	982743	984235	985658	987013	988300	46	4 3
1 0	15	976116	977883	979581	981209	982769	984259	985681	987035	988320	45	0 3
1 4	16	9.976146	9.977912	9.979609	9.981236	9.982794	9.984284	9.985704	9.987057	9 988341	44	56 2
1 8	17	976176	977941	979636	981263	982820	984306	985728	987079	988362	43	52 2
1 12	18	976206	977970	979664	981289	982845	984332	985751	987101	988383	42	48 2
1 16	19	976236	977999	979692	981316	982870	984356	985774	987123	988404	41	44 2
1 20	20	9.976266	9.978027	9.979719	9.981342	9.982896	9.984380	9.985797	9.987145	9.988424	40	40 2
1 24	21	976296	978056	979747	981368	982921	984405	985820	987167	988445	39	36 2
1 28	22	976326	978085	979775	981395	982946	984429	985843	987188	988466	38	32 2
1 32	23	976355	978114	979802	981421	982972	984453	985866	987210	988487	37	28 2
1 36	24	9.976385	9.978142	9.979830	9.981448	9.982997	9.984477	9.985889	9.987232	9.988507	36	24 2
1 40	25	976415	978171	979857	981474	983022	984501	985912	987254	988528	35	20 2
1 44	26	976445	978200	979885	981500	983047	984525	985935	987276	988549	34	16 2
1 48	27	976475	978228	979912	981527	983072	984549	985958	987297	988569	33	12 2
1 52	28	9.976505	9.978257	9.979940	9.981553	9.983098	9.984573	9.985980	9.987319	9.988590	32	8 2
1 56	29	976534	978286	979967	981579	983123	984597	986003	987341	988611	31	4 2
2 0	30	976564	978314	979995	981606	983148	984621	986026	987363	988631	30	0 2
2 4	31	976594	978343	980022	981632	983173	984645	986049	987384	988652	29	56 1
2 8	32	9.976624	9.978371	9.980049	9.981658	9.983198	9.984669	9.986072	9.987406	9.988672	28	52 1
2 12	33	976653	978400	980077	981684	983223	984693	986095	987428	988693	27	48 1
2 16	34	976683	978428	980104	981711	983248	984717	986117	987449	988713	26	44 1
2 20	35	976713	978457	980131	981737	983273	984741	986140	987471	988734	25	40 1
2 24	36	9.976742	9.978485	9.980159	9.981763	9.983298	9.984765	9.986163	9.987493	9.988754	24	36 1
2 28	37	976772	978514	980186	981789	983323	984789	986186	987514	988775	23	32 1
2 32	38	976802	978542	980213	981815	983348	984813	986208	987536	988795	22	28 1
2 36	39	976831	978571	980241	981841	983373	984836	986231	987557	988816	21	24 1
2 40	40	9.976861	9.978599	9.980268	9.981868	9.983398	9.984860	9.986254	9.987579	9.988836	20	20 1
2 44	41	976890	978627	980295	981894	983423	984884	986276	987600	988856	19	16 1
2 48	42	976920	978656	980322	981920	983448	984908	986299	987622	988877	18	12 1
2 52	43	976950	978684	980350	981946	983473	984931	986321	987643	988897	17	8 1
2 56	44	9.976979	9.978712	9.980377	9.981972	9.983498	9.984955	9.986344	9.987665	9.988917	16	4 1
3 0	45	977008	978741	980404	981998	983523	984979	986367	987686	988938	15	0 1
3 4	46	977038	978769	980431	982024	983547	985003	986389	987708	988958	14	56 0
3 8	47	977067	978797	980458	982050	983572	985026	986412	987729	988978	13	52 0
3 12	48	9.977096	9.978826	9.980485	9.982076	9.983597	9.985050	9.986434	9.987750	9.988998	12	48 0
3 16	49	977126	978854	980512	982102	983622	985074	986457	987772	989019	11	44 0
3 20	50	977155	978882	980539	982127	983647	985097	986479	987793	989039	10	40 0
3 24	51	977185	978910	980566	982153	983671	985121	986502	987814	989059	9	36 0
3 28	52	9.977214	9.978938	9.980593	9.982179	9.983696	9.985144	9.986524	9.987836	9.989079	8	32 0
3 32	53	977243	978967	980620	982205	983721	985168	986547	987857	989099	7	28 0
3 36	54	977273	978995	980647	982231	983745	985191	986569	987878	989119	6	24 0
3 40	55	977302	979023	980674	982257	983770	985215	986591	987899	989140	5	20 0
3 44	56	9.977331	9.979051	9.980701	9.982282	9.983795	9.985238	9.986614	9.987921	9.989160	4	16 0
3 48	57	977360	979079	980728	982308	983819	985262	986636	987942	989180	3	12 0
3 52	58	977389	979107	980755	982334	983844	985285	986658	987963	989200	2	8 0
3 56	59	977419	979135	980781	982360	983869	985309	986681	987984	989220	1	4 0
4 0	60	9.977448	9.979163	9.980809	9.982385	9.983893	9.985332	9.986703	9.988005	9.989240	0	0 0
m s												s m
Time.	Arc.	206°	205°	204°	203°	202°	201°	200°	199°	198°	Arc.	Time.
		13h 44m	13h 40m	13h 36m	13h 32m	13h 28m	13h 24m	13h 20m	13h 16m	13h 12m		

Log. Haversines.

Time	Arc.	10h 48m	10h 52m	10h 56m	11h 0m	11h 4m	11h 8m	11h 12m	11h 16m	11h 20m	Arc.	Time
m s	°	162°	163°	164°	165°	166°	167°	168°	169°	170°	°	s m
0 0	0	9.989240	9.990407	9.991506	9.992537	9.993501	9.994399	9.995229	9.995992	9.996688	60	0 4
0 4	1	989260	990425	991523	992554	993517	994413	995242	996004	996699	59	56 3
0 8	2	989280	990444	991541	992570	993532	994427	995255	996016	996711	58	52 3
0 12	3	989300	990463	991559	992587	993548	994442	995268	996028	996722	57	48 3
0 16	4	9.989320	9.990482	9.991576	9.992604	9.993563	9.994456	9.995282	9.996040	9.996733	56	44 3
0 20	5	989340	990501	991594	992620	993578	994470	995295	996053	996743	55	40 3
0 24	6	989360	990519	991612	992637	993594	994485	995308	996065	996754	54	36 3
0 28	7	989379	990538	991629	992653	993610	994499	995321	996077	996765	53	32 3
0 32	8	9.989399	9.990557	9.991647	9.992670	9.993625	9.994513	9.995334	9.996089	9.996776	52	28 3
0 36	9	989419	990576	991665	992686	993640	994527	995347	996101	996787	51	24 3
0 40	10	989439	990594	991682	992703	993656	994542	995361	996113	996798	50	20 3
0 44	11	989459	990613	991700	992719	993671	994556	995374	996125	996809	49	16 3
0 48	12	9.989479	9.990632	9.991717	9.992735	9.993686	9.994570	9.995387	9.996137	9.996820	48	12 3
0 52	13	989498	990650	991735	992752	993701	994584	995400	996149	996831	47	8 3
0 56	14	989518	990669	991752	992768	993717	994598	995413	996160	996841	46	4 3
1 0	15	989538	990688	991770	992785	993732	994612	995426	996172	996852	45	0 3
1 4	16	9.989558	9.990706	9.991787	9.992801	9.993747	9.994626	9.995439	9.996184	9.996863	44	56 2
1 8	17	989577	990725	991805	992817	993762	994641	995452	996196	996874	43	52 2
1 12	18	989597	990743	991822	992833	993778	994655	995465	996208	996884	42	48 2
1 16	19	989617	990762	991840	992850	993793	994669	995478	996220	996895	41	44 2
1 20	20	9.989636	9.990780	9.991857	9.992866	9.993808	9.994683	9.995491	9.996232	9.996906	40	40 2
1 24	21	989656	990800	991874	992882	993823	994697	995503	996243	996916	39	36 2
1 28	22	989675	990817	991892	992899	993838	994711	995516	996255	996927	38	32 2
1 32	23	989695	990836	991909	992915	993853	994725	995529	996267	996938	37	28 2
1 36	24	9.989715	9.990854	9.991926	9.992931	9.993868	9.994739	9.995542	9.996279	9.996948	36	24 2
1 40	25	989734	990873	991944	992947	993883	994753	995555	996290	996959	35	20 2
1 44	26	989754	990891	991961	992963	993898	994767	995568	996302	996970	34	16 2
1 48	27	989773	990909	991978	992979	993913	994780	995580	996314	996980	33	12 2
1 52	28	9.989793	9.990928	9.991995	9.992995	9.993928	9.994794	9.995593	9.996325	9.996991	32	8 2
1 56	29	989812	990946	992013	993012	993943	994808	995606	996337	997001	31	4 2
2 0	30	989832	990964	992030	993028	993958	994822	995619	996349	997012	30	0 2
2 4	31	989851	990983	992047	993044	993973	994836	995631	996360	997022	29	56 1
2 8	32	9.989870	9.991001	9.992064	9.993060	9.993988	9.994850	9.995644	9.996372	9.997033	28	52 1
2 12	33	989890	991019	992081	993076	994003	994863	995657	996383	997043	27	48 1
2 16	34	989909	991038	992098	993092	994018	994877	995669	996395	997054	26	44 1
2 20	35	989929	991056	992115	993108	994033	994891	995682	996406	997064	25	40 1
2 24	36	9.989948	9.991074	9.992133	9.993124	9.994048	9.994905	9.995695	9.996418	9.997074	24	36 1
2 28	37	989967	991092	992150	993140	994063	994918	995707	996429	997085	23	32 1
2 32	38	989987	991110	992167	993156	994077	994932	995720	996441	997095	22	28 1
2 36	39	990006	991129	992184	993172	994092	994946	995732	996452	997105	21	24 1
2 40	40	9.990025	9.991147	9.992201	9.993187	9.994107	9.994959	9.995745	9.996464	9.997116	20	20 1
2 44	41	990044	991165	992218	993203	994122	994973	995757	996475	997126	19	16 1
2 48	42	990064	991183	992234	993219	994136	994987	995770	996487	997136	18	12 1
2 52	43	990083	991201	992252	993235	994151	995000	995782	996498	997147	17	8 1
2 56	44	9.990102	9.991219	9.992269	9.993251	9.994166	9.995014	9.995795	9.996509	9.997157	16	4 1
3 0	45	990121	991237	992286	993267	994181	995027	995807	996521	997167	15	0 1
3 4	46	990140	991255	992302	993282	994195	995041	995820	996532	997177	14	56 0
3 8	47	990159	991273	992319	993298	994210	995055	995832	996543	997187	13	52 0
3 12	48	9.990179	9.991291	9.992336	9.993314	9.994224	9.995068	9.995845	9.996554	9.997198	12	48 0
3 16	49	990198	991309	992353	993330	994239	995082	995857	996566	997208	11	44 0
3 20	50	990217	991327	992370	993345	994254	995095	995869	996577	997218	10	40 0
3 24	51	990236	991345	992387	993361	994268	995108	995882	996588	997228	9	36 0
3 28	52	9.990255	9.991363	9.992403	9.993377	9.994283	9.995122	9.995894	9.996599	9.997238	8	32 0
3 32	53	990274	991381	992420	993392	994297	995135	995906	996611	997248	7	28 0
3 36	54	990294	991399	992437	993408	994312	995149	995919	996622	997258	6	24 0
3 40	55	990312	991417	992454	993424	994326	995162	995931	996633	997268	5	20 0
3 44	56	9.990331	9.991434	9.992470	9.993439	9.994341	9.995175	9.995943	9.996644	9.997278	4	16 0
3 48	57	990350	991452	992487	993455	994355	995189	995955	996655	997288	3	12 0
3 52	58	990369	991470	992504	993470	994370	995202	995968	996666	997298	2	8 0
3 56	59	990388	991488	992520	993486	994384	995215	995980	996677	997308	1	4 0
4 0	60	9.990407	9.991506	9.992537	9.993501	9.994399	9.995229	9.995992	9.996688	9.997318	0	0 0
m s Time.	Arc.	197°	196°	195°	194°	193°	192°	191°	190°	189°	Arc.	s m Time.
		13h 8m	13h 4m	13h 0m	12h 56m	12h 52m	12h 48m	12h 44m	12h 40m	12h 36m		

Log. Haversines.

Time		Arc.	11h 24m	11h 28m	11h 32m	11h 36m	11h 40m	11h 44m	11h 48m	11h 52m	11h 56m	Arc.	Time.
m	s		171°	172°	173°	174°	175°	176°	177°	178°	179°		s m
0	0	0	9.997318	9.997882	9.998378	9.998809	9.999173	9.999471	9.999702	9.999868	9.999967	60	0 4
0	4	1	997328	997890	998386	998815	999178	999475	999706	999870	999968	59	56 3
0	8	2	997338	997899	998394	998822	999184	999480	999709	999872	999969	58	52 3
0	12	3	997348	997908	998401	998829	999189	999484	999712	999874	999970	57	48 3
0	16	4	9.997358	9.997917	9.998409	9.998835	9.999195	9.999488	9.999715	9.999876	9.999971	56	44 3
0	20	5	997368	997926	998417	998842	999200	999493	999719	999878	999972	55	40 3
0	24	6	997378	997934	998424	998848	999205	999497	999722	999881	999973	54	36 3
0	28	7	997387	997943	998432	998855	999211	999501	999725	999883	999974	53	32 3
0	32	8	9.997397	9.997952	9.998440	9.998861	9.999216	9.999505	9.999728	9.999885	9.999975	52	28 3
0	36	9	997407	997960	998447	998868	999222	999510	999731	999887	999976	51	24 3
0	40	10	997417	997969	998455	998874	999227	999514	999734	999889	999977	50	20 3
0	44	11	997427	997978	998462	998881	999232	999518	999738	999891	999978	49	16 3
0	48	12	9.997436	9.997986	9.998470	9.998887	9.999238	9.999522	9.999741	9.999893	9.999979	48	12 3
0	52	13	997446	997995	998477	998893	999243	999527	999744	999895	999980	47	8 3
0	56	14	997456	998003	998484	998900	999248	999531	999747	999897	999981	46	4 3
1	0	15	997465	998012	998492	998906	999254	999535	999750	999899	999981	45	0 3
1	4	16	9.997475	9.998021	9.998500	9.998912	9.999259	9.999539	9.999753	9.999901	9.999982	44	56 2
1	8	17	997485	998029	998507	998919	999264	999543	999756	999903	999983	43	52 2
1	12	18	997494	998038	998514	998925	999269	999547	999759	999904	999984	42	48 2
1	16	19	997504	998046	998522	998931	999274	999551	999762	999906	999985	41	44 2
1	20	20	9.997513	9.998055	9.998529	9.998938	9.999280	9.999555	9.999765	9.999908	9.999985	40	40 2
1	24	21	997523	998063	998537	998944	999285	999559	999768	999910	999986	39	36 2
1	28	22	997533	998071	998544	998950	999290	999563	999771	999912	999987	38	32 2
1	32	23	997542	998080	998551	998956	999295	999567	999774	999914	999987	37	28 2
1	36	24	9.997552	9.998088	9.998559	9.998962	9.999300	9.999571	9.999776	9.999915	9.999988	36	24 2
1	40	25	997561	998097	998566	998969	999305	999575	999779	999917	999989	35	20 2
1	44	26	997571	998105	998573	998975	999310	999579	999782	999919	999989	34	16 2
1	48	27	997580	998113	998580	998981	999315	999583	999785	999921	999990	33	12 2
1	52	28	9.997589	9.998122	9.998588	9.998987	9.999320	9.999587	9.999788	9.999922	9.999991	32	8 2
1	56	29	997599	998130	998595	998993	999325	999591	999791	999924	999991	31	4 2
2	0	30	997608	998138	998602	998999	999330	999595	999793	999926	999992	30	0 2
2	4	31	997618	998147	998609	999005	999335	999599	999796	999927	999992	29	56 1
2	8	32	9.997627	9.998155	9.998616	9.999011	9.999340	9.999602	9.999799	9.999929	9.999993	28	52 1
2	12	33	997636	998163	998623	999017	999345	999606	999801	999930	999993	27	48 1
2	16	34	997646	998171	998630	999023	999350	999610	999804	999932	999994	26	44 1
2	20	35	997655	998179	998638	999029	999355	999614	999807	999934	999994	25	40 1
2	24	36	9.997664	9.998188	9.998645	9.999035	9.999360	9.999618	9.999809	9.999935	9.999995	24	36 1
2	28	37	997674	998195	998652	999041	999364	999621	999812	999937	999995	23	32 1
2	32	38	997683	998204	998659	999047	999369	999625	999814	999938	999996	22	28 1
2	36	39	997692	998212	998666	999053	999374	999629	999817	999940	999996	21	24 1
2	40	40	9.997701	9.998220	9.998673	9.999059	9.999379	9.999632	9.999820	9.999941	9.999996	20	20 1
2	44	41	997710	998228	998680	999065	999384	999636	999822	999943	999997	19	16 1
2	48	42	997720	998236	998687	999071	999388	999640	999825	999944	999997	18	12 1
2	52	43	997729	998244	998694	999076	999393	999643	999828	999946	999997	17	8 1
2	56	44	9.997738	9.998252	9.998701	9.999082	9.999398	9.999647	9.999830	9.999947	9.999998	16	4 1
3	0	45	997747	998260	998707	999088	999402	999651	999832	999948	999998	15	0 1
3	4	46	997756	998268	998714	999094	999407	999654	999835	999950	999998	14	56 0
3	8	47	997765	998276	998721	999100	999412	999658	999837	999951	999998	13	52 0
3	12	48	9.997774	9.998284	9.998728	9.999105	9.999416	9.999661	9.999840	9.999952	9.999999	12	48 0
3	16	49	997783	998292	998735	999111	999421	999665	999842	999954	999999	11	44 0
3	20	50	997792	998300	998742	999116	999426	999668	999845	999955	999999	10	40 0
3	24	51	997801	998308	998748	999123	999430	999672	999847	999956	999999	9	36 0
3	28	52	9.997810	9.998316	9.998755	9.999128	9.999434	9.999675	9.999849	9.999958	9.999999	8	32 0
3	32	53	997819	998324	998762	999134	999439	999679	999852	999959	10.000000	7	28 0
3	36	54	997828	998332	998769	999139	999444	999682	999854	999960	10.000000	6	24 0
3	40	55	997837	998340	998775	999145	999448	999686	999856	999961	10.000000	5	20 0
3	44	56	9.997846	9.998347	9.998782	9.999151	9.999453	9.999689	9.999859	9.999962	10.000000	4	16 0
3	48	57	997855	998355	998789	999156	999457	999692	999861	999964	10.000000	3	12 0
3	52	58	997864	998363	998796	999162	999462	999696	999863	999965	10.000000	2	8 0
3	56	59	997873	998371	998802	999167	999466	999699	999865	999966	10.000000	1	4 0
4	0	60	9.997882	9.998378	9.998809	9.999173	9.999471	9.999702	9.999868	9.999967	10.000000	0	0 0
m	s												m
Time.		Arc.	188°	187°	186°	185°	184°	183°	182°	181°	180°	Arc.	Time.
			12h 32m	12h 28m	12h 24m	12h 20m	12h 16m	12h 12m	12h 8m	12h 4m	12h 0m		

TO FIND COLOGARITHMS OF NUMBERS.

TAKE out the logarithm from the table of logarithms, and subtract it (characteristic as well as mantissa) from 10 in the following manner: subtract every figure from 9, proceeding from left to right, to the last significant figure, which subtract from 10. Cast out as many tens in characteristic of result as there have been cologarithms used.

Thus, to find log. 5306 − log. 4814 + log. 8192 − log. 612, using addition only:—

log.	5306	3·724767
colog.	4814	6·317494
log.	8192	3·913390
colog.	612	7·213249
	log. 14·76	1·168900

N.B. The cologarithm may thus be taken *by sight* from a table of logarithms, by persons accustomed to the use of tables, as easily as the logarithm itself, and with greater security from material error, than from a table of cologarithms. The rule for finding the characteristic of the cologarithm differing from the rule by which the characteristic of the logarithm is found, some considerable probability of serious error is involved in the use of tables of cologarithms.

In the case of negative characteristics, their subtraction from 9 being apparently an addition, it is often as well to cast out the 10 from the cologarithm at once before proceeding to sum.

Thus, to find log. 53·06 − log. ·04814 + log. 8·192 − log. ·00612:—

log.	53·06	= . . .	1·724767
colog.	·04814	= . . .	×1·317494
log.	8·192	= . . .	0·913390
colog.	·00612	= . . .	×2·213249
			6·168900

[*To face Table of Logarithms of Numbers.* p. 895.

Log^s. of numbers from *one* to a *thousand*.

No.	Log.	No.	Log.	No.	Log.	No.	Log.	No.	Log.	No.	Log.	No.	Log.
1	.000000	73	.863323	145	.161368	217	.336460	289	.460898	361	.557507	433	.636488
2	.301030	74	.869232	146	.164353	218	.338457	290	.462398	362	.558709	434	.637490
3	.477121	75	.875061	147	.167317	219	.340444	291	.463893	363	.559907	435	.638489
4	.602060	76	.880814	148	.170262	220	.342423	292	.465383	364	.561101	436	.639486
5	.698970	77	.886491	149	.173186	221	.344392	293	.466868	365	.562293	437	.640481
6	.778151	78	.892095	150	.176091	222	.346353	294	.468347	366	.563481	438	.641474
7	.845098	79	.897627	151	.178977	223	.348305	295	.469822	367	.564666	439	.642465
8	.903090	80	.903090	152	.181844	224	.350248	296	.471292	368	.565848	440	.643453
9	.954243	81	.908485	153	.184691	225	.352183	297	.472756	369	.567026	441	.644439
10	.000000	82	.913814	154	.187521	226	.354108	298	.474216	370	.568202	442	.645422
11	.041393	83	919078	155	.190332	227	.356026	299	.475671	371	.569374	443	.646404
12	.079181	84	.924279	156	.193125	228	.357935	300	.477121	372	.570543	444	.647383
13	.113943	85	.929419	157	.195900	229	.359835	301	.478567	373	.571709	445	.648360
14	.146128	86	934498	158	.198657	230	.361728	302	.480007	374	.572872	446	.649335
15	.176091	87	939519	159	.201397	231	.363612	303	.481443	375	.574031	447	.650308
16	.204120	88	.944483	160	.204120	232	.365488	304	.482874	376	.575188	448	.651278
17	.230449	89	.949390	161	.206826	233	.367356	305	.484300	377	.576341	449	.652246
18	.255273	90	.954243	162	.209515	234	.369216	306	485721	378	.577492	450	.653213
19	.278754	91	.959041	163	.212188	235	.371068	307	.487138	379	.578639	451	.654177
20	.301030	92	.963788	164	.214844	236	.372912	308	.488551	380	.579784	452	.655138
21	.322219	93	.968483	165	.217484	237	.374748	309	.489958	381	.580925	453	.656098
22	.342423	94	.973128	166	.220108	238	.376577	310	.491362	382	.582063	454	.657056
23	.361728	95	.977724	167	.222716	239	.378398	311	.492760	383	.583199	455	.658011
24	.380211	96	.982271	168	.225309	240	.380211	312	.494155	384	.584331	456	.658965
25	.397940	97	.986772	169	.227887	241	.382017	313	.495544	385	.585461	457	.659916
26	.414973	98	.991226	170	.230449	242	.383815	314	.496930	386	.586587	458	.660865
27	.431364	99	.995635	171	.232996	243	.385606	315	.498311	387	.587711	459	.661813
28	.447158	100	.000000	172	.235528	244	.387390	316	.499687	388	.588832	460	.662758
29	.462398	101	.004321	173	.238046	245	.389166	317	.501059	389	.589950	461	.663701
30	.477121	102	.008600	174	.240549	246	.390935	318	.502427	390	.591065	462	.664642
31	.491362	103	.012837	175	.243038	247	.392697	319	.503791	391	.592177	463	.665581
32	.505150	104	.017033	176	.245513	248	.394452	320	.505150	392	.593286	464	.666518
33	.518514	105	.021189	177	.247973	249	.396199	321	.506505	393	.594393	465	.667453
34	.531479	106	.025306	178	.250420	250	.397940	322	.507856	394	.595496	466	.668386
35	.544068	107	.029384	179	.252853	251	.399674	323	.509203	395	.596597	467	.669317
36	.556303	108	.033424	180	.255273	252	.401401	324	.510545	396	.597695	468	.670246
37	.568202	109	.037427	181	.257679	253	.403121	325	.511883	397	.598791	469	.671173
38	.579784	110	.041393	182	.260071	254	.404834	326	.513218	398	.599883	470	.672098
39	.591065	111	.045323	183	.262451	255	.406540	327	.514548	399	.600973	471	.673021
40	.602060	112	.049218	184	.264818	256	.408240	328	.515874	400	.602060	472	.673942
41	.612784	113	.053078	185	.267172	257	.409933	329	.517196	401	.603144	473	.674861
42	.623249	114	.056905	186	.269513	258	.411620	330	.518514	402	.604226	474	.675778
43	.633468	115	.060698	187	.271842	259	.413300	331	.519828	403	.605305	475	.676694
44	.643453	116	.064458	188	.274158	260	.414973	332	.521138	404	.606381	476	.677607
45	.653213	117	.068186	189	.276462	261	.416641	333	.522441	405	.607455	477	.678518
46	662758	118	.071882	190	.278754	262	.418301	334	.523746	406	.608526	478	.679428
47	.672098	119	.075547	191	.281033	263	.419956	335	.525045	407	.609594	479	.680336
48	.681241	120	.079181	192	.283301	264	.421604	336	.526339	408	.610660	480	.681241
49	.690196	121	.082785	193	.285557	265	.423246	337	527630	409	.611723	481	.682145
50	.698970	122	.086360	194	.287802	266	.424882	338	.528917	410	.612784	482	.683047
51	.707570	123	.089905	195	.290035	267	.426511	339	.530200	411	.613842	483	.683947
52	.716003	124	.093422	196	.292256	268	.428135	340	.531479	412	.614897	484	.684845
53	.724276	125	.096910	197	.294466	269	.429752	341	.532754	413	.615950	485	.685742
54	732394	126	.100371	198	.296665	270	.431364	342	.534026	414	.617000	486	.686636
55	.740363	127	.103804	199	.298853	271	.432969	343	.535294	415	.618048	487	.687529
56	.748188	128	.107210	200	.301030	272	.434569	344	.536558	416	.619093	488	.688420
57	.755875	129	.110590	201	.303196	273	.436163	345	.537819	417	.620136	489	.689309
58	.763428	130	.113943	202	.305351	274	.437751	346	.539076	418	.621176	490	690196
59	.770852	131	.117271	203	.307496	275	.439333	347	540329	419	.622214	491	.691081
60	.778151	132	.120574	204	.309630	276	.440909	348	.541579	420	.623249	492	.691965
61	.785330	133	.123852	205	.311754	277	.442480	349	.542825	421	.624282	493	.692847
62	.792392	134	.127105	206	.313867	278	.444045	350	.544068	422	625312	494	.693727
63	.799341	135	.130334	207	.315970	279	.445604	351	.545307	423	.626340	495	.694605
64	.806180	136	.133539	208	.318063	280	.447158	352	.546543	424	.627366	496	.695482
65	.812913	137	.136721	209	.320146	281	.448706	353	.547775	425	.628389	497	.696356
66	.819544	138	.139879	210	.322219	282	450249	354	.549003	426	.629410	498	.697229
67	.826075	139	.143015	211	.324282	283	.451786	355	550228	427	630428	499	.698101
68	832509	140	.146128	212	.326336	284	.453318	356	.551450	428	.631444	500	.698970
69	.838849	141	.149219	213	.328380	285	.454845	357	.552668	429	632457	501	699838
70	.845098	142	.152288	214	.330414	286	.456366	358	.553883	430	.633468	502	.700704
71	.851258	143	.155336	215	.332438	287	.457882	359	.555094	431	.634477	503	.701568
72	.857333	144	.158362	216	.334454	288	.459392	360	.556303	432	.635484	504	.702431

Log^{s}. of numbers from *one* to a *thousand*.

No.	Log.	No.	Log.	No.	Log.	No.	Log.	No.	Log.	No.	Log.	No.	Log.
505	.703291	576	.760422	647	.810904	718	.856124	789	.897077	860	.934498	931	.968956
506	.704151	577	.761176	648	.811575	719	.856729	790	.897627	861	.935003	932	.969416
507	.705006	578	.761928	649	.812245	720	.857333	791	.898176	862	.935507	933	.969882
508	.705864	579	.762679	650	.812913	721	.857935	792	.898725	863	.936011	934	.970347
509	.706718	580	.763428	651	.813581	722	.858537	793	.899273	864	.936514	935	.970812
510	.707570	581	.764176	652	.814248	723	.859138	794	.899821	865	.937016	936	.971276
511	.708421	582	.764923	653	.814913	724	.859739	795	.900367	866	.937518	937	.971740
512	.709270	583	.765669	654	.815578	725	.860338	796	.900913	867	.938019	938	.972203
513	.710117	584	.766413	655	.816241	726	.860937	797	.901458	868	.938520	939	.972666
514	.710963	585	.767156	656	.816904	727	.861534	798	.902003	869	.939020	940	.973128
515	.711807	586	.767898	657	.817565	728	.862131	799	.902547	870	.939519	941	.973590
516	.712650	587	.768638	658	.818226	729	.862728	800	.903090	871	.940018	942	.974051
517	.713491	588	.769377	659	.818885	730	.863323	801	.903633	872	.940516	943	.974512
518	.714330	589	.770115	660	.819544	731	.863917	802	.904174	873	.941014	944	.974972
519	.715167	590	.770852	661	.820201	732	.864511	803	.904716	874	.941511	945	.975432
520	.716003	591	.771587	662	.820858	733	.865104	804	.905256	875	.942008	946	.975891
521	.716838	592	.772322	663	.821514	734	.865696	805	.905796	876	.942504	947	.976350
522	.717671	593	.773055	664	.822168	735	.866287	806	.906335	877	.943000	948	.976808
523	.718502	594	.773786	665	.822822	736	.866878	807	.906874	878	.943495	949	.977266
524	.719331	595	.774517	666	.823474	737	.867467	808	.907411	879	.943989	950	.977724
525	.720159	596	.775246	667	.824126	738	.868056	809	.907949	880	.944483	951	.978181
526	.720986	597	.775974	668	.824776	739	.868644	810	.908485	881	.944976	952	.978637
527	.721811	598	.776701	669	.825426	740	.869232	811	.909021	882	.945469	953	.979093
528	.722634	599	.777427	670	.826075	741	.869818	812	.909556	883	.945961	954	.979548
529	.723456	600	.778151	671	.826723	742	.870404	813	.910091	884	.946452	955	.980003
530	.724276	601	.778874	672	.827369	743	.870989	814	.910624	885	.946943	956	.980458
531	.725095	602	.779596	673	.828015	744	.871573	815	.911158	886	.947434	957	.980912
532	.725912	603	.780317	674	.828660	745	.872156	816	.911690	887	.947924	958	.981366
533	.726727	604	.781037	675	.829304	746	.872739	817	.912222	888	.948413	959	.981819
534	.727541	605	.781755	676	.829947	747	.873321	818	.912753	889	.948902	960	.982271
535	.728354	606	.782473	677	.830589	748	.873902	819	.913284	890	.949390	961	.982723
536	.729165	607	.783189	678	.831230	749	.874482	820	.913814	891	.949878	962	.983175
537	.729974	608	.783904	679	.831870	750	.875061	821	.914343	892	.950365	963	.983626
538	.730782	609	.784617	680	.832509	751	.875640	822	.914872	893	.950851	964	.984077
539	.731589	610	.785330	681	.833147	752	.876218	823	.915400	894	.951338	965	.984527
540	.732394	611	.786041	682	.833784	753	.876795	824	.915927	895	.951823	966	.984977
541	.733197	612	.786751	683	.834421	754	.877371	825	.916454	896	.952308	967	.985426
542	.733999	613	.787460	684	.835056	755	.877947	826	.916980	897	.952792	968	.985875
543	.734800	614	.788168	685	.835691	756	.878522	827	.917506	898	.953276	969	.986324
544	.735599	615	.788875	686	.836324	757	.879096	828	.918030	899	.953760	970	.986772
545	.736397	616	.789581	687	.836957	758	.879669	829	.918555	900	.954243	971	.987219
546	.737193	617	.790285	688	.837588	759	.880242	830	.919078	901	.954725	972	.987666
547	.737987	618	.790988	689	.838219	760	.880814	831	.919601	902	.955207	973	.988113
548	.738781	619	.791691	690	.838849	761	.881385	832	.920123	903	.955688	974	.988559
549	.739572	620	.792392	691	.839478	762	.881955	833	.920645	904	.956168	975	.989005
550	.740363	621	.793092	692	.840106	763	.882525	834	.921166	905	.956649	976	.989450
551	.741152	622	.793790	693	.840733	764	.883093	835	.921686	906	.957128	977	.989895
552	.741939	623	.794488	694	.841359	765	.883661	836	.922206	907	.957607	978	.990339
553	.742725	624	.795185	695	.841985	766	.884229	837	.922725	908	.958086	979	.990783
554	.743510	625	.795880	696	.842609	767	.884795	838	.923244	909	.958564	980	.991226
555	.744293	626	.796574	697	.843233	768	.885361	839	.923762	910	.959041	981	.991669
556	.745075	627	.797268	698	.843855	769	.885926	840	.924279	911	.959518	982	.992111
557	.745855	628	.797960	699	.844477	770	.886491	841	.924796	912	.959995	983	.992554
558	.746634	629	.798651	700	.845098	771	.887054	842	.925312	913	.960471	984	.992995
559	.747412	630	.799341	701	.845718	772	.887617	843	.925828	914	.960946	985	.993436
560	.748188	631	.800029	702	.846337	773	.888179	844	.926342	915	.961421	986	.993877
561	.748963	632	.800717	703	.846955	774	.888741	845	.926857	916	.961895	987	.994317
562	.749736	633	.801404	704	.847573	775	.889302	846	.927370	917	.962369	988	.994757
563	.750508	634	.802089	705	.848189	776	.889862	847	.927883	918	.962843	989	.995196
564	.751279	635	.802774	706	.848805	777	.890421	848	.928396	919	.963316	990	.995635
565	.752048	636	.803457	707	.849419	778	.890980	849	.928908	920	.963788	991	.996074
566	.752816	637	.804139	708	.850033	779	.891537	850	.929419	921	.964260	992	.996512
567	.753583	638	.804821	709	.850646	780	.892095	851	.929930	922	.964731	993	.996949
568	.754348	639	.805501	710	.851258	781	.892651	852	.930440	923	.965202	994	.997386
569	.755112	640	.806180	711	.851870	782	.893207	853	.930949	924	.965672	995	.997823
570	.755875	641	.806858	712	.852480	783	.893762	854	.931458	925	.966142	996	.998259
571	.756636	642	.807535	713	.853090	784	.894316	855	.931966	926	.966611	997	.998695
572	.757396	643	.808211	714	.853698	785	.894870	856	.932474	927	.967080	998	.999131
573	.758155	644	.808886	715	.854306	786	.895423	857	.932981	928	.967548	999	.999566
574	.758912	645	.809560	716	.854913	787	.895975	858	.933487	929	.968016	1000	.000000
575	.759666	646	.810233	717	.855519	788	.896526	859	.933993	930	.968483		

Log. .000000 to .130012 No. 1000 to 1349.

No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log	Part.
1000	.000000	000	1070	.029384	000	1140	.056905	000	1210	.082785	000	1280	.107210	000
1	.000434	043	1	.029789	040	1	.057286	038	1	.083144	036	1	107549	034
2	.000868	086	2	.030195	081	2	.057666	076	2	.083503	071	2	.107888	067
3	.001301	130	3	.030600	121	3	.058046	114	3	.083861	107	3	.108227	101
4	.001734	173	4	.031004	162	4	.058426	152	4	.084219	143	4	.108565	135
5	.002166	216	5	.031408	202	5	.058805	190	5	.084576	179	5	.108903	169
6	.002598	259	6	.031812	242	6	.059185	228	6	.084934	214	6	.109241	203
7	.003029	303	7	.032216	283	7	.059563	266	7	.085291	250	7	.109578	237
8	.003460	346	8	.032619	323	8	.059942	304	8	.085647	286	8	.109916	270
9	003891	389	9	.033021	364	9	.060320	342	9	.086004	322	9	.110253	304
1010	004321	000	1080	.033424	000	1150	.060698	000	1220	.086360	000	1290	.110590	000
1	.004751	043	1	.033826	040	1	.061075	038	1	.086716	035	1	.110926	034
2	.005180	086	2	.034227	080	2	.061452	075	2	087071	071	2	.111262	067
3	.005609	128	3	.034628	120	3	.061829	113	3	.087426	106	3	.111598	101
4	.006038	171	4	.035029	160	4	.062206	150	4	.087781	142	4	.111934	134
5	.006466	214	5	.035430	200	5	.062582	188	5	.088136	177	5	.112270	168
6	.006894	257	6	.035830	240	6	.062958	226	6	.088490	213	6	.112605	201
7	.007321	300	7	.036229	280	7	063333	263	7	.088845	248	7	112940	235
8	.007748	343	8	.036629	321	8	.063709	301	8	.089198	284	8	.113275	268
9	.008174	385	9	.037028	361	9	.064083	338	9	.089552	319	9	113609	302
1020	.008600	000	1090	.037426	000	1160	.064458	000	1230	.089905	000	1300	.113943	000
1	.009026	042	1	.037825	040	1	.064832	037	1	.090258	035	1	.114277	033
2	009451	085	2	.038223	079	2	.065206	075	2	.090611	070	2	.114611	067
3	.009876	127	3	.038620	119	3	.065580	112	3	.090963	106	3	.114944	100
4	.010300	170	4	.039017	159	4	.065953	149	4	.091315	141	4	.115278	133
5	.010724	212	5	.039414	198	5	.066326	186	5	091667	176	5	.115610	167
6	.011147	254	6	.039811	238	6	.066699	224	6	.092018	211	6	.115943	200
7	.011570	297	7	.040207	278	7	.067071	261	7	.092370	246	7	.116276	233
8	.011993	339	8	.040602	318	8	.067443	298	8	.092721	282	8	.116608	267
9	.012415	382	9	.040998	357	9	.067814	336	9	.093071	317	9	.116940	300
1030	.012837	000	1100	.041393	000	1170	.068186	000	1240	.093422	000	1310	117271	000
1	.013259	042	1	.041787	039	1	.068557	037	1	.093772	035	1	.117603	033
2	.013680	084	2	.042182	079	2	068928	074	2	.094122	070	2	117934	066
3	.014100	126	3	.042575	118	3	.069298	111	3	.094471	105	3	.118265	099
4	.014520	168	4	.042969	157	4	.069668	148	4	.094820	140	4	.118595	132
5	.014940	210	5	.043362	196	5	.070038	185	5	.095169	175	5	118926	165
6	.015360	252	6	.043755	236	6	.070407	222	6	.095518	210	6	.119256	198
7	.015779	294	7	.044148	275	7	.070776	259	7	.095866	245	7	.119586	231
8	.016197	336	8	044540	314	8	.071145	296	8	.096215	280	8	.119915	264
9	016615	378	9	.044931	354	9	.071514	333	9	.096562	315	9	120245	297
1040	.017033	000	1110	.045323	000	1180	.071882	000	1250	.096910	000	1320	.120574	000
1	.017451	042	1	045714	039	1	.072250	037	1	.097257	035	1	.120903	033
2	.017868	083	2	.046105	078	2	.072617	073	2	.097604	069	2	.121231	066
3	.018284	125	3	.046495	117	3	.072985	110	3	.097951	104	3	.121560	098
4	.018700	166	4	.046885	156	4	.073352	147	4	.098297	138	4	.121888	131
5	.019116	208	5	.047275	195	5	.073718	183	5	.098644	173	5	.122216	164
6	.019532	250	6	.047664	234	6	.074085	220	6	.098990	208	6	.122543	197
7	.019947	291	7	.048053	273	7	.074451	256	7	.099335	240	7	.122871	230
8	.020361	333	8	.048442	312	8	.074816	293	8	.099681	277	8	.123198	262
9	.020775	374	9	.048830	351	9	.075182	330	9	.100026	311	9	.123525	295
1050	.021189	000	1120	.049218	000	1190	.075547	000	1260	.100370	000	1330	.123852	000
1	.021603	041	1	.049606	039	1	.075912	036	1	.100715	034	1	.124178	033
2	.022016	082	2	.049993	077	2	.076276	073	2	.101059	069	2	.124504	065
3	.022428	124	3	.050380	116	3	.076640	109	3	.101403	103	3	.124830	098
4	.022841	165	4	.050766	154	4	.077004	145	4	.101747	137	4	.125156	130
5	.023252	206	5	.051152	193	5	.077368	181	5	.102090	172	5	.125481	163
6	.023664	247	6	.051538	232	6	.077731	218	6	.102434	206	6	.125806	195
7	.024075	288	7	.051924	270	7	.078094	254	7	.102777	240	7	.126131	228
8	.024486	330	8	.052309	309	8	.078457	290	8	.103119	275	8	.126456	260
9	.024896	371	9	.052694	347	9	.078819	327	9	.103462	309	9	.126781	293
1060	.025306	000	1130	.053078	000	1200	.079181	000	1270	.103804	000	1340	.127105	000
1	.025715	041	1	.053463	038	1	.079543	036	1	.104146	034	1	.127429	032
2	.026124	082	2	.053846	077	2	.079904	072	2	.104487	068	2	.127752	065
3	.026533	122	3	.054230	115	3	.080266	108	3	.104828	102	3	.128076	097
4	.026942	163	4	.054613	153	4	.080626	144	4	.105169	136	4	.128399	129
5	.027350	204	5	.054996	191	5	.080987	180	5	.105510	170	5	.128722	161
6	.027757	245	6	.055378	230	6	.081347	216	6	.105851	204	6	.129045	194
7	.028164	286	7	.055760	268	7	.081707	252	7	.106191	238	7	.129368	226
8	.028571	326	8	.056142	306	8	.082067	288	8	.106531	272	8	.129690	258
9	.028978	367	9	.056524	345	9	.082426	324	9	.106870	306	9	.130012	291

Log. .130334 to .230193 No. 1350 to 1699.

No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.
1350	.130334	000	1420	.152288	000	1490	.173186	000	1560	.193125	000	1630	.212188	000
1	.130655	032	1	.152594	030	1	.173478	029	1	.193403	028	1	.212454	027
2	.130977	064	2	.152900	061	2	.173769	058	2	.193681	056	2	.212720	053
3	.131298	096	3	.153205	091	3	.174060	087	3	.193959	083	3	.212986	080
4	.131619	128	4	.153510	122	4	.174351	116	4	.194237	111	4	.213252	106
5	.131939	160	5	.153815	152	5	.174641	145	5	.194514	139	5	.213518	133
6	.132260	192	6	.154119	183	6	.174932	175	6	.194792	166	6	.213783	159
7	.132580	224	7	.154424	213	7	.175222	204	7	.195069	194	7	.214049	186
8	.132900	256	8	.154728	244	8	.175512	233	8	.195346	222	8	.214314	212
9	.133219	288	9	.155032	274	9	.175802	261	9	.195623	250	9	.214579	239
1360	.133539	000	1430	.155336	000	1500	.176091	000	1570	195900	000	1640	.214844	000
1	.133858	032	1	.155640	030	1	.176381	029	1	.196176	027	1	215109	026
2	.134177	064	2	.155943	060	2	.176670	058	2	.196452	055	2	.215373	053
3	134496	096	3	.156246	091	3	.176959	086	3	.196729	083	3	.215638	079
4	.134814	127	4	.156549	121	4	.177248	115	4	.197005	110	4	.215902	106
5	.135133	159	5	.156852	151	5	.177536	144	5	.197281	138	5	.216166	132
6	.135451	191	6	.157154	181	6	.177825	173	6	.197556	166	6	.216430	158
7	.135768	223	7	.157457	211	7	.178113	202	7	.197832	193	7	.216694	185
8	.136086	255	8	.157759	242	8	.178401	231	8	.198107	221	8	.216957	211
9	.136403	287	9	.158061	272	9	.178689	259	9	.198382	248	9	.217221	238
1370	.136721	000	1440	.158362	000	1510	.178977	000	1580	.198657	000	1650	.217484	000
1	.137037	032	1	.158664	030	1	.179264	029	1	198932	027	1	.217747	026
2	.137354	063	2	.158965	060	2	.179552	057	2	.199206	055	2	.218010	052
3	.137670	094	3	.159266	090	3	.179839	086	3	.199481	082	3	.218273	079
4	.137987	126	4	.159567	120	4	.180126	115	4	.199755	110	4	.218535	105
5	.138303	158	5	.159868	150	5	.180413	144	5	.200029	137	5	.218798	131
6	.138618	189	6	.160168	180	6	.180699	172	6	.200303	164	6	.219060	157
7	.138934	221	7	.160468	210	7	.180986	201	7	.200577	192	7	.219322	183
8	.139249	252	8	.160769	240	8	.181272	230	8	.200850	219	8	219584	210
9	.139564	284	9	.161068	270	9	.181558	258	9	.201124	247	9	.219846	236
1380	.139879	000	1450	.161368	000	1520	.181844	000	1590	.201397	000	1660	.220108	000
1	.140194	031	1	.161667	030	1	.182129	028	1	.201670	027	1	.220370	026
2	.140508	063	2	.161967	060	2	.182415	057	2	.201943	054	2	.220631	052
3	.140822	094	3	.162266	089	3	.182700	086	3	.202216	082	3	.220892	078
4	.141136	125	4	.162564	119	4	.182985	114	4	.202488	109	4	.221153	104
5	.141450	157	5	.162863	149	5	.183270	143	5	.202761	136	5	.221414	130
6	.141763	188	6	.163161	179	6	.183554	171	6	.203033	163	6	.221675	157
7	.142076	219	7	.163460	209	7	.183839	200	7	.203305	191	7	.221936	183
8	.142389	251	8	.163757	239	8	.184123	228	8	.203577	218	8	.222196	209
9	.142702	282	9	.164055	269	9	.184407	256	9	.203848	245	9	.222456	235
1390	.143015	000	1460	.164353	000	1530	.184691	000	1600	.204120	000	1670	.222716	000
1	.143327	031	1	.164650	030	1	.184975	028	1	.204391	027	1	.222976	026
2	.143639	062	2	.164947	059	2	.185259	057	2	.204662	054	2	.223236	052
3	.143951	093	3	.165244	089	3	.185542	085	3	.204933	081	3	.223496	078
4	.144263	125	4	.165541	119	4	.185825	113	4	.205204	108	4	.223755	104
5	.144574	156	5	.165838	148	5	.186108	142	5	.205475	135	5	.224015	130
6	.144885	187	6	.166134	178	6	.186391	170	6	.205745	162	6	.224274	156
7	.145196	218	7	.166430	207	7	.186674	198	7	.206016	189	7	.224533	182
8	.145507	249	8	.166726	237	8	.186956	227	8	.206286	216	8	.224792	208
9	.145818	280	9	.167022	267	9	.187239	255	9	.206556	243	9	.225051	234
1400	.146128	000	1470	.167317	000	1540	.187521	000	1610	.206826	000	1680	.225309	000
1	.146438	031	1	.167613	029	1	.187803	028	1	.207095	027	1	.225568	026
2	.146748	062	2	.167908	059	2	.188084	056	2	.207365	054	2	.225826	052
3	.147058	093	3	.168203	088	3	.188366	084	3	.207634	081	3	.226084	077
4	.147367	124	4	.168497	118	4	.188647	113	4	.207903	108	4	.226342	103
5	.147676	155	5	.168792	147	5	.188928	141	5	.208172	135	5	.226600	129
6	.147985	186	6	.169086	177	6	.189209	169	6	.208441	162	6	.226858	155
7	.148294	217	7	.169380	206	7	.189490	197	7	.208710	188	7	.227115	181
8	.148603	248	8	.169674	236	8	.189771	225	8	.208978	215	8	.227372	206
9	.148911	279	9	.169968	265	9	.190051	253	9	.209247	241	9	.227630	232
1410	.149219	000	1480	.170262	000	1550	.190332	000	1620	.209515	000	1690	.227887	000
1	.149527	031	1	.170555	029	1	.190612	028	1	.209783	027	1	.228144	026
2	.149835	061	2	.170848	058	2	.190892	056	2	.210051	054	2	.228400	051
3	.150142	092	3	.171141	088	3	.191171	084	3	.210318	080	3	.228657	077
4	.150449	123	4	.171434	117	4	.191451	112	4	.210586	107	4	.228913	102
5	.150756	154	5	.171726	146	5	.191730	140	5	.210853	134	5	.229170	128
6	.151063	184	6	.172019	175	6	.192010	168	6	.211120	161	6	.229426	154
7	.151370	215	7	.172311	204	7	.192289	196	7	.211388	187	7	.229682	179
8	.151677	246	8	.172603	234	8	.192567	224	8	.211654	214	8	.229938	205
9	.151982	277	9	.172895	263	9	.192846	252	9	.211921	240	9	.230193	1

Log. .230449 to .311542 No. 1700 to 2049.

No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.
1700	.230449	000	1770	.247973	000	1840	.264818	000	1910	.281033	000	1980	.296665	000
1	.230704	025	1	248219	025	1	.265054	023	1	.281261	023	1	.296884	022
2	.230960	051	2	.248464	049	2	.265290	047	2	.281488	045	2	.297104	044
3	.231215	076	3	.248709	074	3	.265525	070	3	.281715	068	3	.297323	066
4	.231470	102	4	.248954	098	4	.265761	094	4	.281942	091	4	.297542	088
5	231724	127	5	.249198	123	5	.265996	117	5	.282169	113	5	.297760	109
6	.231979	153	6	249443	147	6	.266232	141	6	.282395	136	6	.297979	131
7	.232233	178	7	.249687	172	7	.266467	164	7	.282622	159	7	298198	153
8	.23248C	204	8	.249932	196	8	.266702	188	8	.282849	181	8	.298416	175
9	.232742	229	9	.250176	220	9	.266937	211	9	.283075	204	9	.298635	197
1710	.232996	000	1780	.250420	000	1850	.267172	000	1920	.283301	000	1990	298853	000
1	.233250	025	1	.250664	024	1	.267406	023	1	.283527	023	1	.299071	022
2	.233504	051	2	.250908	049	2	.267641	047	2	.283753	045	2	299289	044
3	.233757	076	3	.251151	073	3	.267875	070	3	.283979	068	3	.299507	065
4	.234011	101	4	.251395	097	4	.268110	094	4	.284205	090	4	.299725	087
5	.234264	127	5	.251638	121	5	.268344	117	5	.284431	113	5	.299943	109
6	234517	152	6	.251881	146	6	.268578	141	6	.284656	135	6	.300160	131
7	.234770	177	7	.252125	171	7	.268812	164	7	.284882	158	7	.300378	153
8	.235023	202	8	.252367	195	8	.269046	188	8	.285107	180	8	.300595	174
9	.235276	228	9	.252610	219	9	.269279	211	9	.285332	203	9	.300813	196
1720	.235528	000	1790	.252853	000	1860	.269513	000	1930	.285557	000	2000	.301030	000
1	.235781	025	1	.253096	024	1	.269746	023	1	.285782	022	1	.301247	022
2	.236033	050	2	.253338	048	2	.269980	047	2	.286007	045	2	.301464	043
3	.236285	076	3	.253580	073	3	.270213	070	3	.286232	067	3	.301681	065
4	.236537	101	4	.253822	097	4	.270446	093	4	.286456	089	4	.301898	087
5	.236789	126	5	.254064	121	5	.270679	116	5	.286681	112	5	.302114	108
6	.237041	151	6	.254306	145	6	.270912	140	6	286905	134	6	.302331	130
7	.237292	176	7	254548	170	7	.271144	163	7	.287130	157	7	.302547	152
8	.237544	202	8	.254790	194	8	.271377	186	8	.287354	179	8	.302764	173
9	237795	227	9	.255031	218	9	.271609	210	9	.287578	202	9	.302980	195
1730	238046	000	1800	.255272	000	1870	.271842	000	1940	.287802	000	2010	.303196	000
1	.238297	025	1	.255514	024	1	.272074	023	1	.288025	022	1	.303412	022
2	.238548	050	2	.255755	048	2	.272306	046	2	.288249	045	2	.303628	043
3	.238799	075	3	.255996	072	3	.272538	070	3	.288473	067	3	.303844	065
4	.239049	100	4	.256236	096	4	.272770	093	4	.288696	089	4	.304059	086
5	.239299	125	5	.256477	120	5	.273001	116	5	.288920	112	5	.304275	108
6	.239550	150	6	.256718	144	6	.273233	139	6	.289143	134	6	.304490	129
7	.239800	175	7	.256958	168	7	.273464	162	7	.289366	156	7	304706	151
8	.240050	200	8	.257198	192	8	.273696	186	8	.289589	178	8	.304921	172
9	.240300	225	9	.257439	216	9	.273927	209	9	.289812	201	9	.305136	194
1740	.240549	000	1810	.257679	000	1880	.274158	000	1950	.290035	000	2020	.305351	000
1	.240799	025	1	257918	024	1	.274389	023	1	.290257	022	1	.305566	021
2	.241048	050	2	.258158	048	2	.274620	046	2	.290480	044	2	.305781	043
3	.241297	075	3	.258398	072	3	.274850	069	3	.290702	067	3	.305996	064
4	.241546	100	4	.258637	096	4	.275081	092	4	.290925	089	4	.306210	086
5	.241795	124	5	.258877	120	5	.275311	115	5	.291147	111	5	.306425	107
6	.242044	149	6	259116	144	6	.275542	138	6	.291369	133	6	.306639	129
7	.242293	174	7	.259355	167	7	.275772	161	7	.291591	156	7	.306854	150
8	.242541	199	8	.259594	192	8	.276002	184	8	.291813	178	8	.307068	172
9	.242790	223	9	.259833	215	9	.276232	207	9	.292034	200	9	.307282	193
1750	.243038	000	1820	.260071	000	1890	276462	000	1960	.292256	000	2030	.307496	000
1	.243286	025	1	.260310	024	1	.276691	023	1	292478	022	1	.307710	021
2	.243534	050	2	.260548	048	2	.276921	046	2	.292699	044	2	.307924	043
3	.243782	074	3	.260787	071	3	.277151	069	3	.292920	066	3	.308137	064
4	.244030	099	4	.261025	095	4	.277380	092	4	.293141	088	4	.308351	085
5	.244277	124	5	.261263	119	5	.277609	115	5	.293363	110	5	.308564	107
6	.244524	149	6	.261501	143	6	.277838	138	6	.293583	133	6	308778	128
7	.244772	174	7	.261738	167	7	.278067	161	7	.293804	155	7	308991	149
8	.245019	198	8	.261976	191	8	.278296	183	8	.294025	177	8	.309204	171
9	.245266	222	9	.262214	214	9	.278525	206	9	.294246	199	9	.309417	192
1760	245513	000	1830	.262451	000	1900	.278754	000	1970	.294466	000	2040	.309630	000
1	.245759	025	1	.262688	024	1	.278982	023	1	.294687	022	1	.309843	021
2	.246006	049	2	.262925	047	2	.279210	045	2	.294907	044	2	.310056	043
3	.246252	074	3	.263162	071	3	.279439	068	3	.295127	066	3	.310268	064
4	.246499	098	4	.263399	095	4	.279667	091	4	.295347	088	4	.310481	085
5	.246745	123	5	.263636	118	5	.279895	114	5	.295567	110	5	.310693	106
6	.246991	148	6	.263873	142	6	.280123	137	6	.295787	132	6	.310906	127
7	.247236	173	7	.264109	166	7	.280351	160	7	.296007	154	7	.311118	148
8	.247482	197	8	.264345	190	8	.280578	182	8	.296226	176	8	.311330	170
9	.247728	221	9	.264582	213	9	.280806	205	9	.296446	198	9	.311542	191

Log. .311754 to .380030 No. 2050 to 2399.

No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.
2050	.311754	000	2120	.326336	000	2190	.340444	000	2260	.354108	000	2330	.367356	000
1	.311966	021	1	.326541	020	1	.340642	020	1	.354301	019	1	.367542	019
2	.312177	042	2	.326745	041	2	.340840	040	2	.354493	038	2	.367728	037
3	.312389	063	3	.326950	061	3	.341039	059	3	.354685	058	3	.367915	056
4	.312600	084	4	.327154	082	4	.341237	079	4	.354876	077	4	.368101	075
5	.312812	106	5	.327359	102	5	.341434	099	5	.355068	096	5	.368287	093
6	.313023	127	6	.327563	123	6	.341632	119	6	.355260	115	6	.368473	112
7	.313234	148	7	.327767	143	7	.341830	139	7	.355451	134	7	.368659	130
8	.313445	169	8	.327972	164	8	.342028	158	8	.355643	154	8	.368844	149
9	.313656	190	9	.328176	184	9	.342225	178	9	.355834	173	9	.369030	167
2060	.313867	000	2130	.328380	000	2200	.342423	000	2270	.356026	000	2340	.369216	000
1	.314078	021	1	.328583	020	1	.342620	020	1	.356217	019	1	.369401	019
2	.314289	042	2	.328787	041	2	.342817	039	2	.356408	038	2	.369587	037
3	.314499	063	3	.328991	061	3	.343014	059	3	.356599	057	3	.369772	056
4	.314710	084	4	.329194	081	4	.343212	079	4	.356790	076	4	.369958	074
5	.314920	105	5	.329398	102	5	.343409	099	5	.356981	095	5	.370143	093
6	.315130	126	6	.329601	122	6	.343605	118	6	.357172	115	6	.370328	111
7	.315340	147	7	.329804	142	7	.343802	138	7	.357363	134	7	.370513	130
8	.315550	168	8	.330008	163	8	.343999	158	8	.357554	153	8	.370698	148
9	.315760	189	9	.330211	183	9	.344196	178	9	.357744	172	9	.370883	167
2070	.315970	000	2140	.330414	000	2210	.344392	000	2280	.357935	000	2350	.371068	000
1	.316180	021	1	.330617	020	1	.344589	020	1	.358125	019	1	.371253	018
2	.316390	042	2	.330819	040	2	.344785	039	2	.358316	038	2	.371437	037
3	.316599	063	3	.331022	061	3	.344981	059	3	.358506	057	3	.371622	055
4	.316809	084	4	.331225	081	4	.345178	078	4	.358696	076	4	.371806	074
5	.317018	105	5	.331427	101	5	.345374	098	5	.358886	095	5	.371991	092
6	.317227	126	6	.331630	121	6	.345570	118	6	.359076	114	6	.372175	111
7	.317436	147	7	.331832	141	7	.345766	137	7	.359266	133	7	.372360	129
8	.317645	168	8	.332034	162	8	.345962	157	8	.359456	152	8	.372544	148
9	.317854	189	9	.332236	182	9	.346157	176	9	.359646	171	9	.372728	166
2080	.318063	000	2150	.332438	000	2220	.346353	000	2290	.359835	000	2360	.372912	000
1	.318272	021	1	.332640	020	1	.346549	019	1	.360025	019	1	.373096	018
2	.318481	042	2	.332842	040	2	.346744	039	2	.360215	038	2	.373280	037
3	.318689	063	3	.333044	060	3	.346939	058	3	.360404	057	3	.373464	055
4	.318898	083	4	.333246	081	4	.347135	078	4	.360593	076	4	.373647	074
5	.319106	104	5	.333447	101	5	.347330	097	5	.360783	095	5	.373831	092
6	.319314	125	6	.333649	121	6	.347525	117	6	.360972	114	6	.374015	110
7	.319522	146	7	.333850	141	7	.347720	137	7	.361161	133	7	.374198	129
8	.319730	167	8	.334051	161	8	.347915	156	8	.361350	152	8	.374382	147
9	.319938	188	9	.334253	181	9	.348110	175	9	.361539	171	9	.374565	166
2090	.320146	000	2160	.334454	000	2230	.348305	000	2300	.361728	000	2370	.374748	000
1	.320354	021	1	.334655	020	1	.348500	019	1	.361917	019	1	.374932	018
2	.320562	041	2	.334856	040	2	.348694	039	2	.362105	038	2	.375115	037
3	.320769	062	3	.335056	060	3	.348889	058	3	.362294	056	3	.375298	055
4	.320977	083	4	.335257	080	4	.349083	078	4	.362482	075	4	.375481	073
5	.321184	104	5	.335458	100	5	.349277	097	5	.362671	094	5	.375664	092
6	.321391	125	6	.335658	120	6	.349472	117	6	.362859	113	6	.375846	110
7	.321598	145	7	.335859	140	7	.349666	137	7	.363048	132	7	.376029	128
8	.321805	166	8	.336059	160	8	.349860	156	8	.363236	151	8	.376212	147
9	.322012	187	9	.336260	180	9	.350054	175	9	.363424	170	9	.376394	165
2100	.322219	000	2170	.336460	000	2240	.350248	000	2310	.363612	000	2380	.376577	000
1	.322426	021	1	.336660	020	1	.350442	019	1	.363800	019	1	.376759	018
2	.322633	041	2	.336860	040	2	.350636	039	2	.363988	037	2	.376942	036
3	.322839	062	3	.337060	060	3	.350829	058	3	.364176	056	3	.377124	055
4	.323046	082	4	.337259	080	4	.351023	077	4	.364363	075	4	.377306	073
5	323252	103	5	.337459	100	5	.351216	097	5	.364551	094	5	.377488	091
6	.323458	124	6	.337659	120	6	.351410	116	6	.364739	112	6	.377670	109
7	.323664	144	7	.337858	140	7	.351603	135	7	.364926	131	7	.377852	127
8	.323871	165	8	.338058	160	8	.351796	155	8	.365113	150	8	.378034	146
9	.324077	186	9	338257	180	9	.351989	174	9	.365301	169	9	.378215	164
2110	.324282	000	2180	.338456	000	2250	.352182	000	2320	.365488	000	2390	378398	000
1	.324488	021	1	.338656	020	1	.352375	019	1	.365675	019	1	.378580	018
2	.324694	041	2	.338855	040	2	.352568	038	2	.365862	037	2	.378761	036
3	.324899	062	3	.339054	060	3	.352761	058	3	.366049	056	3	.378943	055
4	.325105	082	4	.339253	080	4	.352954	077	4	.366236	075	4	.379124	073
5	.325310	103	5	.339451	100	5	.353146	096	5	.366423	093	5	.379305	091
6	.325516	123	6	.339650	119	6	.353339	115	6	.366610	112	6	.379487	109
7	.325721	144	7	.339849	139	7	.353532	134	7	.366796	131	7	.379668	127
8	.325926	164	8	.340047	159	8	.353724	154	8	.366983	150	8	.379849	146
9	.326131	185	9	.340246	179	9	.353916	173	9	.367169	168	9	.380030	164

Log. .380211 to .439175 No. 2400 to 2749.

No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.
2400	.380211	000	2470	.392697	000	2540	.404834	000	2610	.416640	000	2680	.428135	000
1	.380392	018	1	.392873	018	1	.405005	017	1	.416807	017	1	428297	016
2	380573	036	2	.393048	035	2	.405175	034	2	.416973	033	2	.428459	032
3	.380754	055	3	.393224	053	3	.405346	051	3	.417139	050	3	.428621	048
4	.380934	073	4	.393400	070	4	.405517	068	4	.417306	066	4	428782	065
5	.381115	091	5	.393575	088	5	.405688	085	5	.417472	083	5	.428944	081
6	.381296	109	6	393751	106	6	.405858	102	6	.417638	100	6	.429106	097
7	.381476	127	7	.393926	123	7	.406029	119	7	.417804	116	7	.429268	113
8	.381656	145	8	.394101	141	8	.406199	136	8	.417970	133	8	.429429	129
9	.381837	163	9	.394276	158	9	.406370	153	9	.418135	149	9	.429591	145
2410	.382017	000	2480	.394452	000	2550	.406540	000	2620	.418301	000	2690	.429752	000
1	382197	018	1	.394627	017	1	.406710	017	1	.418467	017	1	.429914	016
2	.382377	036	2	.394802	035	2	.406881	034	2	.418633	033	2	.430075	032
3	.382557	054	3	.394977	053	3	.407051	051	3	.418798	050	3	.430236	048
4	.382737	072	4	.395152	070	4	.407221	068	4	418964	066	4	.430398	065
5	.382917	090	5	.395326	087	5	.407391	085	5	.419129	083	5	.430559	081
6	.383097	108	6	.395501	104	6	.407561	102	6	419295	099	6	.430720	097
7	.383277	126	7	.395676	122	7	.407731	119	7	.419460	116	7	.430881	113
8	.383456	144	8	.395850	139	8	.407900	136	8	419625	132	8	.431042	129
9	.383636	162	9	.396025	157	9	.408070	153	9	.419791	149	9	.431203	145
2420	.383815	000	2490	.396199	000	2560	408240	000	2630	.419956	000	2700	.431364	000
1	.383995	018	1	.396374	017	1	.408410	017	1	.420121	016	1	.431525	016
2	.384174	036	2	.396548	035	2	.408579	034	2	.420286	033	2	.431685	032
3	.384353	054	3	.396722	053	3	.408749	051	3	.420451	049	3	.431846	048
4	.384533	072	4	.396896	070	4	.408918	068	4	.420616	066	4	.432007	064
5	.384712	090	5	.397070	087	5	.409087	085	5	.420781	082	5	.432167	080
6	.384891	108	6	.397245	104	6	.409257	102	6	.420945	099	6	.432328	096
7	.385070	126	7	.397418	122	7	.409426	119	7	.421110	115	7	.432488	112
8	.385249	144	8	.397592	139	8	409595	136	8	.421275	132	8	.432649	128
9	.385427	162	9	.397766	157	9	.409764	153	9	.421439	148	9	.432809	144
2430	.385606	000	2500	.397940	000	2570	409933	000	2640	.421604	000	2710	.432969	000
1	.385785	018	1	.398114	017	1	.410102	017	1	.421768	016	1	.433129	016
2	.385964	035	2	.398287	035	2	.410271	034	2	.421933	033	2	.433290	032
3	.386142	053	3	.398461	053	3	.410440	050	3	.422097	049	3	.433450	048
4	.386321	071	4	.398634	069	4	.410608	067	4	.422261	066	4	.433610	064
5	386499	089	5	.398808	087	5	410777	084	5	.422426	082	5	.433770	080
6	.386677	107	6	.398981	104	6	.410946	101	6	.422590	099	6	.433930	096
7	.386855	125	7	.399154	121	7	.411114	118	7	.422754	115	7	.434090	112
8	.387034	143	8	.399327	138	8	411283	135	8	.422918	132	8	.434249	128
9	387212	161	9	.399501	156	9	.411451	152	9	.423082	148	9	.434409	144
2440	.387390	000	2510	.399674	000	2580	.411620	000	2650	.423246	000	2720	.434569	000
1	.387568	018	1	.399847	017	1	.411788	017	1	.423410	016	1	.434728	016
2	.387746	036	2	.400020	035	2	.411956	034	2	.423573	033	2	.434888	032
3	.387923	053	3	400192	053	3	.412124	050	3	.423737	049	3	.435048	048
4	.388101	071	4	400365	069	4	.412292	067	4	.423901	065	4	.435207	064
5	.388279	089	5	.400538	087	5	.412460	084	5	.424064	081	5	.435366	080
6	.388456	107	6	.400711	104	6	.412628	101	6	.424228	098	6	.435526	096
7	.388634	125	7	.400883	121	7	.412796	118	7	.424392	114	7	.435685	112
8	.388811	142	8	.401056	138	8	.412964	135	8	.424555	131	8	.435844	128
9	.388989	160	9	.401228	156	9	.413132	152	9	.424718	147	9	.436003	144
2450	.389166	000	2520	.401400	000	2590	413300	000	2660	.424882	000	2730	.436163	000
1	.389343	018	1	.401573	017	1	.413467	017	1	.425045	016	1	.436322	016
2	.389520	036	2	.401745	034	2	.413635	033	2	.425208	033	2	.436481	032
3	.389697	053	3	.401917	052	3	413802	050	3	.425371	049	3	.436640	047
4	.389875	071	4	.402089	069	4	.413970	067	4	.425534	065	4	.436798	063
5	.390051	089	5	.402261	086	5	414137	084	5	.425697	081	5	.436957	079
6	.390228	107	6	.402433	103	6	.414305	101	6	.425860	098	6	.437116	095
7	.390405	125	7	.402605	120	7	.414472	117	7	.426023	114	7	.437275	111
8	.390582	142	8	.402777	138	8	414639	134	8	.426186	130	8	.437433	127
9	.390758	160	9	.402949	155	9	.414806	151	9	.426349	147	9	.437592	143
2460	390935	000	2530	403120	000	2600	414973	000	2670	.426511	000	2740	.437751	000
1	.391112	018	1	.403292	017	1	.415140	017	1	.426674	016	1	.437909	016
2	.391288	035	2	.403464	034	2	.415307	033	2	.426836	033	2	.438067	032
3	.391464	053	3	.403635	052	3	.415474	050	3	.426999	049	3	.438226	047
4	.391641	070	4	.403807	069	4	.415641	067	4	.427161	065	4	.438384	063
5	.391817	088	5	.403978	086	5	.415808	084	5	.427324	081	5	.438542	079
6	.391993	106	6	.404149	103	6	.415974	101	6	.427486	098	6	.438700	095
7	.392169	123	7	.404320	120	7	.416141	117	7	.427648	114	7	.438859	111
8	.392345	141	8	.404492	137	8	.416308	134	8	.427811	130	8	.439017	127
9	.392521	158	9	.404663	154	9	.416474	150	9	.427973	147	9	.439175	143

Log. .439333 to .491222 No. 2750 to 3099.

No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part
2750	.439333	000	2820	.450249	000	2890	.460898	000	2960	.471292	000	3030	.481443	000
1	.439491	016	1	.450403	015	1	.461048	015	1	.471438	015	1	.481586	014
2	.439648	032	2	.450557	031	2	.461198	030	2	.471585	029	2	.481729	029
3	.439806	047	3	.450711	046	3	.461348	045	3	.471732	044	3	.481872	043
4	.439964	063	4	.450865	062	4	.461498	060	4	.471878	059	4	.482016	057
5	.440122	079	5	.451018	077	5	.461649	075	5	.472025	073	5	.482159	071
6	.440279	095	6	.451172	092	6	.461799	090	6	.472171	088	6	.482302	086
7	.440437	111	7	.451326	108	7	.461948	105	7	.472317	102	7	.482445	100
8	.440594	126	8	.451479	123	8	.462098	120	8	.472464	117	8	.482588	114
9	.440752	142	9	.451633	139	9	.462248	135	9	.472610	132	9	.482731	129
2760	.440909	000	2830	.451786	000	2900	462398	000	2970	472756	000	3040	.482874	000
1	.441066	016	1	.451940	015	1	.462548	015	1	.472903	015	1	.483016	014
2	.441224	031	2	.452093	031	2	462697	030	2	.473049	029	2	.483159	028
3	.441381	047	3	.452247	046	3	.462847	045	3	.473195	044	3	.483302	043
4	.441538	063	4	.452400	061	4	462997	060	4	.473341	059	4	.483445	057
5	.441695	078	5	.452553	077	5	.463146	075	5	.473487	073	5	.483587	071
6	.441852	094	6	.452706	092	6	.463296	090	6	.473633	088	6	.483730	085
7	.442009	110	7	.452859	107	7	.463445	105	7	.473779	102	7	.483872	099
8	.442166	126	8	.453012	123	8	.463594	120	8	.473925	117	8	.484015	114
9	.442323	141	9	.453165	138	9	463744	135	9	.474070	132	9	.484157	128
2770	.442480	000	2840	.453318	000	2910	463893	000	2980	.474216	000	3050	.484300	000
1	.442636	016	1	.453471	015	1	.464042	015	1	.474362	015	1	.484442	014
2	.442793	031	2	.453624	031	2	464191	030	2	.474508	029	2	.484584	028
3	.442950	047	3	.453777	046	3	464340	045	3	.474653	044	3	.484727	043
4	.443106	063	4	453930	061	4	464489	060	4	.474799	058	4	.484869	057
5	.443263	078	5	.454082	077	5	464639	075	5	.474944	073	5	.485011	071
6	.443419	094	6	.454235	092	6	464787	090	6	.475090	088	6	.485153	085
7	.443576	110	7	.454387	107	7	.464936	105	7	.475235	102	7	.485295	099
8	.443732	126	8	.454540	123	8	.465085	120	8	.475381	117	8	.485437	114
9	.443888	141	9	.454692	138	9	465234	135	9	.475526	131	9	.485579	128
2780	.444045	000	2850	454845	000	2920	.465383	000	2990	.475671	000	3060	.485721	000
1	.444201	016	1	.454997	015	1	.465532	015	1	.475816	015	1	.485863	014
2	.444357	031	2	.455149	030	2	.465680	030	2	.475962	029	2	.486005	028
3	.444513	047	3	.455302	046	3	465829	044	3	.476107	043	3	.486147	043
4	444669	062	4	.455454	061	4	.465977	059	4	.476252	058	4	.486289	057
5	444825	078	5	.455606	076	5	.466126	074	5	.476397	072	5	.486430	071
6	.444981	094	6	.455758	091	6	.466274	089	6	.476542	087	6	.486572	085
7	.445137	109	7	.455910	106	7	.466423	104	7	.476687	101	7	.486714	099
8	.445293	125	8	.456062	122	8	.466571	118	8	.476832	116	8	.486855	114
9	.445448	140	9	.456214	137	9	.466719	133	9	476976	130	9	.486997	128
2790	.445604	000	2860	.456366	000	2930	.466868	000	3000	.477121	000	3070	.487138	000
1	.445760	016	1	.456518	015	1	.467016	015	1	.477266	014	1	.487280	014
2	.445915	031	2	.456670	030	2	.467164	030	2	.477411	029	2	.487421	028
3	.446071	047	3	.456821	046	3	467312	044	3	.477555	043	3	.487563	042
4	.446226	062	4	.456973	061	4	.467460	059	4	.477700	058	4	.487704	057
5	.446382	078	5	.457125	076	5	.467608	074	5	.477844	072	5	487845	071
6	.446537	094	6	.457276	091	6	.467756	089	6	477989	087	6	.487986	085
7	.446692	109	7	.457428	106	7	.467904	104	7	.478133	101	7	.488127	099
8	.446848	125	8	.457579	122	8	.468052	118	8	.478278	116	8	.488269	113
9	.447003	140	9	.457730	137	9	.468200	133	9	478422	130	9	.488410	127
2800	.447158	000	2870	457882	000	2940	.468347	000	3010	.478566	000	3080	.488551	000
1	.447313	015	1	.458033	015	1	.468495	015	1	.478711	014	1	.488692	014
2	.447468	031	2	.458184	030	2	.468643	030	2	.478855	029	2	.488833	028
3	.447623	046	3	.458336	045	3	.468790	044	3	.478999	043	3	488973	042
4	.447778	062	4	.458487	061	4	468938	059	4	.479143	058	4	.489114	056
5	447933	077	5	.458638	076	5	.469085	074	5	.479287	072	5	489255	070
6	.448088	093	6	.458789	091	6	.469233	089	6	.479431	086	6	.489396	084
7	.448242	108	7	.458940	106	7	.469380	104	7	479575	101	7	.489537	098
8	.448397	124	8	.459091	121	8	.469527	118	8	.479719	115	8	.489677	112
9	.448552	139	9	.459242	136	9	.469675	133	9	.479863	130	9	.489818	126
2810	.448706	000	2880	.459392	000	2950	.469822	000	3020	.480007	000	3090	.489958	000
1	.448861	015	1	.459543	015	1	.469969	015	1	.480151	014	1	.490099	014
2	.449015	031	2	.459694	030	2	.470116	029	2	.480294	029	2	.490239	028
3	.449170	046	3	.459845	045	3	.470263	044	3	.480438	043	3	.490380	042
4	.449324	062	4	.459995	061	4	.470410	059	4	.480582	058	4	.490520	056
5	.449478	077	5	.460146	076	5	.470557	074	5	.480725	072	5	.490661	070
6	.449633	092	6	.460296	091	6	.470704	088	6	.480869	086	6	.490801	084
7	.449787	108	7	.460447	106	7	.470851	103	7	.481012	101	7	.490941	098
8	.449941	123	8	.460597	121	8	.470998	118	8	.481156	115	8	.491081	112
9	.450095	139	9	.460747	136	9	.471145	132	9	.481299	130	9	.491222	126

Log. .491362 to .537693 No. 3100 to 3449.

No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.
3100	.491362	000	3170	.501059	000	3240	.510545	000	3310	.519828	000	3380	.528917	000
1	.491502	014	1	.501196	014	1	.510679	013	1	.519959	013	1	.529045	013
2	.491642	028	2	.501333	027	2	.510813	027	2	.520090	026	2	.529174	026
3	.491782	042	3	.501470	041	3	.510947	040	3	.520221	039	3	.529302	038
4	.491922	056	4	.501607	055	4	.511081	054	4	.520352	052	4	.529430	051
5	.492062	070	5	.501744	068	5	.511215	067	5	.520483	066	5	.529559	064
6	.492201	084	6	.501880	082	6	.511348	080	6	.520614	079	6	.529687	077
7	.492341	098	7	502017	096	7	.511482	094	7	.520745	092	7	.529815	090
8	.492481	112	8	.502154	110	8	.511616	107	8	.520876	105	8	.529943	103
9	.492621	126	9	.502290	123	9	.511750	121	9	.521007	118	9	.530072	116
3110	.492760	000	3180	.502427	000	3250	.511883	000	3320	.521138	000	3390	.530200	000
1	.492900	014	1	.502564	014	1	.512017	013	1	.521269	013	1	.530328	013
2	.493040	028	2	.502700	027	2	.512150	027	2	.521400	026	2	.530456	026
3	.493179	042	3	.502837	041	3	.512284	040	3	.521530	039	3	.530584	038
4	.493319	056	4	.502973	054	4	.512417	053	4	.521661	052	4	.530712	051
5	.493458	070	5	.503109	068	5	.512551	067	5	.521792	065	5	.530840	064
6	.493597	084	6	.503246	082	6	.512684	080	6	.521922	078	6	.530968	077
7	.493737	098	7	.503382	095	7	.512818	093	7	.522053	097	7	.531095	090
8	.493876	112	8	.503518	109	8	.512951	107	8	.522183	104	8	.531223	102
9	.494015	126	9	.503654	123	9	.513084	120	9	.522314	117	9	.531351	115
3120	.494155	000	3190	.503791	000	3260	.513218	000	3330	.522444	000	3400	.531479	000
1	.494294	014	1	.503927	014	1	.513351	013	1	.522575	013	1	531607	013
2	.494433	028	2	504063	027	2	.513484	027	2	.522705	026	2	.531734	025
3	.494572	041	3	504199	041	3	513617	040	3	.522835	039	3	.531862	038
4	.494711	056	4	.504335	054	4	.513750	053	4	.522966	052	4	.531990	051
5	.494850	069	5	.504471	068	5	.513883	066	5	.523096	065	5	.532117	063
6	.494989	083	6	.504607	082	6	.514016	080	6	.523226	078	6	.532245	076
7	.495128	097	7	.504743	095	7	.514149	093	7	.523356	097	7	.532372	089
8	.495267	111	8	.504878	109	8	.514282	106	8	.523486	104	8	.532500	102
9	.495406	125	9	.505014	122	9	.514415	120	9	.523616	117	9	.532627	114
3130	.495544	000	3200	.505150	000	3270	.514548	000	3340	.523746	000	3410	.532754	000
1	.495683	014	1	505286	014	1	.514680	013	1	.523876	013	1	.532882	013
2	.495822	028	2	.505421	027	2	.514813	027	2	.524006	026	2	.533009	025
3	.495960	041	3	.505557	041	3	.514946	040	3	.524136	039	3	.533136	038
4	.496099	056	4	.505692	054	4	.515079	053	4	.524266	052	4	.533263	051
5	.496237	069	5	.505828	068	5	.515211	066	5	.524396	065	5	.533391	063
6	.496376	083	6	.505963	082	6	.515344	080	6	.524526	078	6	.533518	076
7	.496514	097	7	.506099	095	7	.515476	093	7	.524656	091	7	.533645	089
8	.496653	111	8	.506234	109	8	.515609	106	8	.524785	104	8	.533772	102
9	.496791	125	9	.506370	122	9	.515741	120	9	.524915	117	9	.533899	114
3140	.496930	000	3210	.506505	000	3280	.515874	000	3350	.525045	000	3420	.534026	000
1	.497068	014	1	.506640	013	1	.516006	013	1	.525174	013	1	.534153	013
2	.497206	028	2	.506775	027	2	.516139	026	2	.525304	026	2	.534280	025
3	.497344	041	3	.506911	040	3	.516271	040	3	.525434	039	3	.534407	038
4	.497482	055	4	.507046	054	4	.516403	053	4	.525563	052	4	.534534	051
5	.497621	069	5	.507181	067	5	.516535	066	5	.525692	065	5	.534661	063
6	.497759	083	6	.507316	081	6	.516668	079	6	.525822	078	6	.534787	076
7	.497897	097	7	.507451	094	7	.516800	092	7	.525951	091	7	.534914	089
8	.498035	110	8	.507586	108	8	.516932	106	8	.526081	104	8	.535041	102
9	.498173	124	9	.507721	121	9	.517064	119	9	.526210	117	9	.535167	114
3150	498311	000	3220	.507856	000	3290	.517196	000	3360	.526339	000	3430	.535294	000
1	.498448	014	1	.507991	013	1	.517328	013	1	.526468	013	1	.535421	013
2	.498586	028	2	.508125	027	2	.517460	026	2	.526598	026	2	.535547	025
3	.498724	041	3	.508260	040	3	.517592	040	3	.526727	039	3	.535674	038
4	.498862	055	4	.508395	054	4	.517724	053	4	.526856	052	4	.535800	050
5	.498999	069	5	.508530	067	5	.517855	066	5	.526985	065	5	.535927	063
6	.499137	083	6	.508664	081	6	517987	079	6	.527114	078	6	.536053	076
7	.499275	097	7	.508799	094	7	.518119	092	7	.527243	091	7	.536179	088
8	.499412	110	8	.508933	108	8	.518251	106	8	.527372	104	8	.536306	101
9	.499550	124	9	.509068	121	9	.518382	119	9	.527501	117	9	.536432	114
3160	.499687	000	3230	.509202	000	3300	.518514	000	3370	.527630	000	3440	.536558	000
1	499824	014	1	.509337	013	1	.518645	013	1	.527759	013	1	.536685	013
2	.499962	027	2	.509471	027	2	.518777	026	2	.527888	026	2	.536811	025
3	.500099	041	3	.509606	040	3	.518909	039	3	.528016	038	3	.536937	038
4	.500236	055	4	.509740	054	4	.519040	052	4	.528145	051	4	.537063	050
5	.500374	068	5	.509874	067	5	.519171	066	5	.528274	064	5	.537189	063
6	.500511	082	6	.510008	081	6	.519303	079	6	.528402	077	6	.537315	076
7	.500648	096	7	.510143	094	7	.519434	092	7	.528531	090	7	.537441	088
8	.500785	110	8	.510277	108	8	.519565	105	8	.528660	103	8	.537567	101
9	.500922	123	9	.510411	121	9	.519697	118	9	.528788	116	9	.537693	114

Log. .537819 to .579669 No. 3450 to 3799.

No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.
3450	537819	000	3520	.546543	000	3590	.555094	000	3660	.563481	000	3730	.571709	000
1	.537945	013	1	.546666	012	1	.555215	012	1	.563600	012	1	.571825	012
2	.538071	025	2	.546789	025	2	.555336	024	2	.563718	024	2	.571942	023
3	.538197	038	3	.546913	037	3	.555457	036	3	.563837	036	3	.572058	035
4	.538322	050	4	.547036	049	4	.555578	048	4	.563955	048	4	.572174	047
5	.538448	063	5	.547159	062	5	.555699	060	5	.564074	060	5	.572291	058
6	.538574	076	6	.547282	074	6	.555820	072	6	.564192	071	6	.572407	070
7	.538699	088	7	.547405	086	7	.555940	084	7	.564311	083	7	.572523	081
8	.538825	101	8	.547529	099	8	.556061	096	8	.564429	095	8	.572639	093
9	.538951	114	9	.547652	111	9	.556182	108	9	.564548	107	9	.572755	105
3460	.539076	000	3530	.547775	000	3600	.556302	000	3670	.564666	000	3740	.572872	000
1	.539202	013	1	.547898	012	1	.556423	012	1	.564784	012	1	.572988	012
2	.539327	025	2	.548021	025	2	.556544	024	2	.564903	024	2	.573104	023
3	.539452	038	3	.548144	037	3	.556664	036	3	.565021	036	3	.573220	035
4	.539578	050	4	.548266	049	4	.556785	048	4	.565139	047	4	.573336	046
5	.539703	063	5	.548389	061	5	.556905	060	5	.565257	059	5	.573452	058
6	.539829	075	6	.548512	074	6	.557026	072	6	.565375	071	6	.573568	070
7	.539954	088	7	.548635	086	7	.557146	084	7	.565494	083	7	.573684	081
8	.540079	100	8	.548758	098	8	.557266	096	8	.565612	095	8	.573800	093
9	.540204	113	9	.548881	111	9	.557387	108	9	.565730	107	9	.573915	104
3470	.540329	000	3540	.549003	000	3610	.557507	000	3680	.565848	000	3750	.574031	000
1	.540455	012	1	.549126	012	1	.557627	012	1	.565966	012	1	.574147	012
2	.540580	025	2	.549249	025	2	.557748	024	2	.566084	024	2	.574263	023
3	.540705	037	3	.549371	037	3	.557868	036	3	.566202	035	3	.574379	035
4	.540830	050	4	.549494	049	4	.557988	048	4	.566320	047	4	.574494	046
5	.540955	062	5	.549616	061	5	.558108	060	5	.566437	059	5	.574610	058
6	.541080	075	6	.549739	074	6	.558228	072	6	.566555	071	6	.574726	070
7	.541205	087	7	.549861	086	7	.558348	084	7	.566673	083	7	.574841	081
8	.541330	100	8	.549984	098	8	.558469	096	8	.566791	094	8	.574957	093
9	.541454	112	9	.550106	111	9	.558589	108	9	.566909	106	9	.575072	104
3480	.541579	000	3550	.550228	000	3620	.558709	000	3690	.567026	000	3760	.575188	000
1	.541704	012	1	.550351	012	1	.558828	012	1	.567144	012	1	.575303	012
2	.541829	025	2	.550473	024	2	.558948	024	2	.567262	024	2	.575419	023
3	.541953	037	3	.550595	037	3	.559068	036	3	.567379	035	3	.575534	035
4	.542078	050	4	.550717	049	4	.559188	048	4	.567497	047	4	.575650	046
5	.542203	062	5	.550840	061	5	.559308	060	5	.567614	059	5	.575765	058
6	.542327	075	6	.550962	073	6	.559428	072	6	.567732	071	6	.575880	069
7	.542452	087	7	.551084	086	7	.559548	084	7	.567849	083	7	.575996	080
8	.542576	100	8	.551206	098	8	.559667	096	8	.567967	094	8	.576111	092
9	.542701	112	9	.551328	110	9	.559787	108	9	.568084	106	9	.576226	104
3490	.542825	000	3560	.551450	000	3630	.559907	000	3700	.568202	000	3770	.576341	000
1	.542950	012	1	.551572	012	1	.560026	012	1	.568319	012	1	.576456	012
2	.543074	025	2	.551694	024	2	.560146	024	2	.568436	023	2	.576572	023
3	.543199	037	3	.551816	037	3	.560265	036	3	.568554	035	3	.576687	035
4	.543323	050	4	.551938	049	4	.560385	048	4	.568671	047	4	.576802	046
5	.543447	062	5	.552059	061	5	.560504	060	5	.568788	058	5	.576917	058
6	.543571	075	6	.552181	073	6	.560624	072	6	.568905	070	6	.577032	069
7	.543696	087	7	.552303	086	7	.560743	084	7	.569023	082	7	.577147	080
8	.543820	100	8	.552425	098	8	.560863	096	8	.569140	094	8	.577262	092
9	.543944	112	9	.552546	110	9	.560982	108	9	.569257	106	9	.577377	104
3500	.544068	000	3570	.552668	000	3640	.561101	000	3710	.569374	000	3780	.577492	009
1	.544192	012	1	.552790	012	1	.561221	012	1	.569491	012	1	.577607	011
2	.544316	025	2	.552911	024	2	.561340	024	2	.569608	023	2	.577721	023
3	.544440	037	3	.553033	036	3	.561459	036	3	.569725	035	3	.577836	034
4	.544564	050	4	.553154	049	4	.561578	048	4	.569842	047	4	.577951	046
5	.544688	062	5	.553276	061	5	.561697	060	5	.569959	058	5	.578066	057
6	.544812	074	6	.553397	073	6	.561817	072	6	.570076	070	6	.578181	068
7	.544936	087	7	.553519	085	7	.561936	084	7	.570193	082	7	.578295	080
8	.545060	099	8	.553640	097	8	.562055	096	8	.570309	094	8	.578410	091
9	.545183	112	9	.553762	109	9	.562174	108	9	.570426	106	9	.578525	103
3510	.545307	000	3580	.553883	000	3650	.562293	000	3720	.570543	000	3790	.578639	000
1	.545431	012	1	.554004	012	1	.562412	012	1	.570660	012	1	.578754	011
2	.545554	025	2	.554126	024	2	.562531	024	2	.570776	023	2	.578868	023
3	.545678	037	3	.554247	036	3	.562650	036	3	.570893	035	3	.578983	034
4	.545802	049	4	.554368	049	4	.562768	048	4	.571010	047	4	.579097	046
5	.545926	062	5	.554489	061	5	.562887	060	5	.571126	058	5	.579212	057
6	.546049	074	6	.554610	073	6	.563006	071	6	.571243	070	6	.579326	068
7	.546172	086	7	.554731	085	7	.563125	083	7	.571359	081	7	.579441	080
8	.546296	099	8	.554852	097	8	.563244	095	8	.571476	093	8	.579555	091
9	.546419	111	9	.554973	109	9	.563362	107	9	.571592	105	9	.579669	103

Log. .579784 to .617943 No. 3800 to 4149.

No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.
3800	.579784	000	3870	.587711	000	3940	.595496	000	4010	.603144	000	4080	.610660	000
1	.579898	011	1	.587823	011	1	.595606	011	1	.603253	011	1	.610767	011
2	.580012	023	2	.587935	022	2	.595717	022	2	.603361	022	2	.610873	021
3	.580126	034	3	.588047	034	3	.595827	033	3	.603469	033	3	.610979	032
4	.580240	046	4	.588160	045	4	.595937	044	4	.603577	043	4	.611086	042
5	.580355	057	5	.588272	056	5	.596047	055	5	.603685	054	5	.611192	053
6	.580469	068	6	.588384	067	6	.596157	066	6	.603794	065	6	.611298	064
7	.580583	080	7	.588496	078	7	.596267	077	7	.603902	076	7	.611405	074
8	.580697	091	8	.588608	090	8	.596377	088	8	.604010	087	8	.611511	085
9	.580811	103	9	.588720	101	9	.596487	099	9	.604118	098	9	.611617	095
3810	.580925	000	3880	.588832	000	3950	.596597	000	4020	.604226	000	4090	.611723	000
1	.581039	011	1	.588944	011	1	.596707	011	1	.604334	011	1	.611829	011
2	.581153	023	2	.589055	022	2	.596817	022	2	.604442	022	2	.611936	021
3	.581267	034	3	.589167	033	3	.596927	033	3	.604550	032	3	.612042	032
4	.581381	046	4	.589279	044	4	.597037	044	4	.604658	043	4	.612148	042
5	.581494	057	5	.589391	056	5	.597146	055	5	.604766	054	5	.612254	053
6	.581608	068	6	.589503	067	6	.597256	066	6	.604874	065	6	.612360	064
7	.581722	080	7	.589614	078	7	.597366	077	7	.604982	076	7	.612466	074
8	.581836	091	8	.589726	089	8	.597476	088	8	.605089	086	8	.612572	085
9	.581950	103	9	.589838	100	9	.597585	099	9	.605197	097	9	.612678	095
3820	.582063	000	3890	.589950	000	3960	.597695	000	4030	.605305	000	4100	.612784	000
1	.582177	011	1	.590061	011	1	.597805	011	1	.605413	011	1	.612890	011
2	.582291	023	2	.590173	022	2	.597914	022	2	.605520	022	2	.612996	021
3	.582404	034	3	.590284	033	3	.598024	033	3	.605628	032	3	.613101	032
4	.582518	045	4	.590396	044	4	.598134	044	4	.605736	043	4	.613207	042
5	.582631	056	5	.590507	056	5	.598243	055	5	.605843	054	5	.613313	053
6	.582745	068	6	.590619	067	6	.598353	066	6	.605951	065	6	.613419	064
7	.582858	079	7	.590730	078	7	.598462	077	7	.606059	076	7	.613525	074
8	.582972	090	8	.590842	089	8	.598572	088	8	.606166	086	8	.613630	085
9	.583085	102	9	.590953	100	9	.598681	099	9	.606274	097	9	.613736	095
3830	.583199	000	3900	.591065	000	3970	.598790	000	4040	.606381	000	4110	.613842	000
1	.583312	011	1	.591176	011	1	.598900	011	1	.606489	011	1	.613947	011
2	.583425	023	2	.591287	022	2	.599009	022	2	.606596	021	2	.614053	021
3	.583539	034	3	.591399	033	3	.599119	033	3	.606704	032	3	.614159	032
4	.583652	045	4	.591510	044	4	.599228	044	4	.606811	043	4	.614264	042
5	.583765	056	5	.591621	056	5	.599337	055	5	.606918	054	5	.614370	053
6	.583879	068	6	.591732	067	6	.599446	066	6	.607026	064	6	.614475	063
7	.583992	079	7	.591843	078	7	.599556	077	7	.607133	075	7	.614581	074
8	.584105	090	8	.591955	089	8	.599665	088	8	.607240	086	8	.614686	084
9	.584218	102	9	.592066	100	9	.599774	099	9	.607348	096	9	.614792	095
3840	.584331	000	3910	.592177	000	3980	.599883	000	4050	.607455	000	4120	.614897	000
1	.584444	011	1	.592288	011	1	.599992	011	1	.607562	011	1	.615003	011
2	.584557	023	2	.592399	022	2	.600101	022	2	.607669	021	2	.615108	021
3	.584670	034	3	.592510	033	3	.600210	033	3	.607777	032	3	.615213	031
4	.584783	045	4	.592621	044	4	.600319	044	4	.607884	043	4	.615319	042
5	.584896	056	5	.592732	055	5	.600428	054	5	.607991	054	5	.615424	052
6	.585009	068	6	.592843	067	6	.600537	065	6	.608098	064	6	.615529	063
7	.585122	079	7	.592954	078	7	.600646	076	7	.608205	075	7	.615634	073
8	.585235	090	8	.593064	089	8	.600755	087	8	.608312	086	8	.615740	084
9	.585348	102	9	.593175	100	9	.600864	098	9	.608419	096	9	.615845	095
3850	.585461	000	3920	.593286	000	3990	.600973	000	4060	.608526	000	4130	.615950	000
1	.585573	011	1	.593397	011	1	.601082	011	1	.608633	011	1	.616055	011
2	.585686	022	2	.593508	022	2	.601190	022	2	.608740	021	2	.616160	021
3	.585799	034	3	.593618	033	3	.601299	033	3	.608847	032	3	.616265	031
4	.585912	045	4	.593729	044	4	.601408	044	4	.608954	043	4	.616370	042
5	.586024	056	5	.593840	055	5	.601517	054	5	.609060	053	5	.616475	052
6	.586137	067	6	.593950	066	6	.601625	065	6	.609167	064	6	.616580	063
7	.586250	078	7	.594061	077	7	.601734	076	7	.609274	075	7	.616685	073
8	.586362	090	8	.594171	088	8	.601843	087	8	.609381	086	8	.616790	084
9	.586475	101	9	.594282	099	9	.601951	098	9	.609488	096	9	.616895	095
3860	.586587	000	3930	.594393	000	4000	.602060	000	4070	.609594	000	4140	.617000	000
1	.586700	011	1	.594503	011	1	.602169	011	1	.609701	011	1	.617105	010
2	.586812	022	2	.594613	022	2	.602277	022	2	.609808	021	2	.617210	021
3	.586925	034	3	.594724	033	3	.602386	033	3	.609914	032	3	.617315	031
4	.587037	045	4	.594834	044	4	.602494	043	4	.610021	043	4	.617420	042
5	.587149	056	5	.594945	055	5	.602602	054	5	.610128	053	5	.617524	052
6	.587262	067	6	.595055	066	6	.602711	065	6	.610234	064	6	.617629	063
7	.587374	078	7	.595165	077	7	.602819	076	7	.610341	075	7	.617734	073
8	.587486	090	8	.595276	088	8	.602928	087	8	.610447	086	8	.617839	084
9	.587599	101	9	.595386	099	9	.603036	098	9	.610554	096	9	.617943	094

Log. .618048 to .653116 No. 4150 to 4499.

No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.
4150	.618048	000	4220	.625312	000	4290	.632457	000	4360	.639486	000	4430	.646404	000
1	.618153	010	1	.625415	010	1	.632558	010	1	.639586	010	1	.646502	010
2	.618257	021	2	.625518	021	2	.632660	020	2	.639686	020	2	.646600	020
3	.618362	031	3	.625621	031	3	.632761	030	3	.639785	030	3	.646698	029
4	.618466	042	4	.625724	041	4	.632862	041	4	.639885	040	4	.646796	039
5	.618571	052	5	.625827	051	5	.632963	051	5	.639984	050	5	.646894	049
6	.618675	062	6	.625929	062	6	.633064	061	6	.640084	060	6	.646991	059
7	.618780	073	7	.626032	072	7	.633165	071	7	.640183	070	7	.647089	069
8	.618884	083	8	.626135	082	8	.633266	081	8	.640283	080	8	.647187	078
9	.618989	094	9	.626238	093	9	.633367	091	9	.640382	090	9	.647285	088
4160	.619093	000	4230	.626340	000	4300	.633468	000	4370	640481	000	4440	.647383	000
1	.619198	010	1	.626443	010	1	.633569	010	1	.640581	010	1	.647481	010
2	.619302	021	2	.626546	021	2	.633670	020	2	.640680	020	2	.647579	020
3	.619406	031	3	.626648	031	3	.633771	030	3	.640779	030	3	.647676	029
4	.619511	042	4	.626751	041	4	.633872	040	4	.640879	040	4	.647774	039
5	.619615	052	5	.626853	051	5	.633973	050	5	.640978	050	5	.647872	049
6	.619719	062	6	.626956	062	6	.634074	061	6	.641077	060	6	.647969	059
7	.619823	073	7	.627058	072	7	.634175	071	7	.641176	070	7	.648067	069
8	.619928	083	8	.627161	082	8	.634276	081	8	.641276	080	8	.648165	078
9	.620032	094	9	.627263	093	9	.634376	091	9	.641375	090	9	.648262	088
4170	.620136	000	4240	.627366	000	4310	.634477	000	4380	.641474	000	4450	.648360	000
1	.620240	010	1	.627468	010	1	.634578	010	1	.641573	010	1	.648458	010
2	.620344	021	2	.627571	020	2	.634679	020	2	.641672	020	2	.648555	019
3	.620448	031	3	.627673	031	3	.634779	030	3	.641771	030	3	.648653	029
4	.620552	042	4	.627775	041	4	.634880	040	4	.641870	040	4	.648750	039
5	.620656	052	5	.627878	051	5	.634981	050	5	.641970	050	5	.648848	049
6	.620760	062	6	.627980	061	6	.635081	061	6	.642069	059	6	.648945	058
7	.620864	073	7	.628082	072	7	.635182	071	7	.642168	069	7	.649043	068
8	.620968	083	8	.628184	082	8	.635283	081	8	.642267	079	8	.649140	078
9	.621072	094	9	.628287	092	9	.635383	091	9	.642366	089	9	.649237	088
4180	.621176	000	4250	.628389	000	4320	.635484	000	4390	.642464	000	4460	.649335	000
1	.621280	010	1	.628491	010	1	635584	010	1	.642563	010	1	.649432	010
2	.621384	021	2	.628593	020	2	.635685	020	2	.642662	020	2	.649530	019
3	.621488	031	3	.628695	031	3	.635785	030	3	.642761	030	3	.649627	029
4	.621592	042	4	.628797	041	4	.635886	040	4	.642860	040	4	.649724	039
5	.621695	052	5	.628900	051	5	.635986	050	5	.642959	049	5	.649821	049
6	.621799	062	6	.629002	061	6	.636086	060	6	.643058	059	6	.649919	058
7	.621903	073	7	.629104	072	7	.636187	070	7	.643156	069	7	.650016	068
8	.622007	083	8	.629206	082	8	.636287	080	8	.643255	079	8	.650113	078
9	.622110	094	9	.629308	092	9	636388	090	9	.643354	089	9	.650210	088
4190	.622214	000	4260	.629410	000	4330	.636488	000	4400	.643453	000	4470	.650307	000
1	.622318	010	1	.629511	010	1	.636588	010	1	.643551	010	1	.650405	010
2	.622421	021	2	.629613	020	2	.636688	020	2	.643650	020	2	.650502	019
3	.622525	031	3	.629715	030	3	.636789	030	3	.643749	030	3	.650599	029
4	.622628	041	4	.629817	041	4	.636889	040	4	.643847	039	4	.650696	039
5	.622732	052	5	.629919	051	5	.636989	050	5	.643946	049	5	.650793	049
6	.622835	062	6	.630021	061	6	.637089	060	6	.644044	059	6	.650890	058
7	.622939	072	7	.630123	071	7	.637189	070	7	.644143	069	7	.650987	068
8	.623042	083	8	.630224	081	8	.637289	080	8	.644242	079	8	.651084	078
9	.623146	093	9	.630326	091	9	.637390	090	9	.644340	089	9	.651181	088
4200	.623249	000	4270	.630428	000	4340	.637490	000	4410	.644439	000	4480	651278	000
1	.623353	010	1	.630530	010	1	.637590	010	1	.644537	010	1	.651375	010
2	.623456	021	2	.630631	020	2	.637690	020	2	.644635	020	2	.651472	019
3	.623559	031	3	.630733	030	3	.637790	030	3	.644734	030	3	.651569	029
4	.623663	041	4	.630834	041	4	.637890	040	4	.644832	039	4	.651666	038
5	.623766	052	5	.630936	051	5	.637990	050	5	.644931	049	5	.651762	048
6	.623869	062	6	.631038	061	6	.638090	060	6	.645029	059	6	.651859	058
7	.623972	072	7	.631139	071	7	.638190	070	7	.645127	069	7	.651956	067
8	.624076	083	8	.631241	081	8	.638289	080	8	.645226	079	8	.652053	077
9	.624179	093	9	.631342	091	9	.638389	090	9	.645324	089	9	.652150	087
4210	.624282	000	4280	631444	000	4350	.638489	000	4420	.645422	000	4490	.652246	000
1	.624385	010	1	.631545	010	1	.638589	010	1	.645520	010	1	.652343	010
2	.624488	021	2	.631647	020	2	.638689	020	2	.645619	020	2	.652440	019
3	.624591	031	3	.631748	030	3	.638789	030	3	.645717	030	3	.652536	029
4	.624694	041	4	.631849	041	4	.638888	040	4	.645815	039	4	.652633	038
5	.624798	051	5	.631951	051	5	.638988	050	5	.645913	049	5	.652730	048
6	.624901	062	6	.632052	061	6	.639088	060	6	.646011	059	6	.652826	058
7	.625004	072	7	.632153	071	7	.639188	070	7	.646109	069	7	.652923	067
8	.625107	082	8	.632255	081	8	.639287	080	8	.646208	079	8	.653019	077
9	.625209	093	9	.632356	091	9	.639387	090	9	.646306	089	9	.653116	087

Log. .653213 to .685652 No. 4500 to 4849.

No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.
4500	.653213	000	4570	.659916	000	4640	.666518	000	4710	673021	000	4780	.679428	000
1	.653309	010	1	.660011	010	1	.666612	009	1	.673113	009	1	.679519	009
2	.653405	019	2	.660106	019	2	.666705	019	2	.673205	018	2	.679610	018
3	653502	029	3	.660201	028	3	.666799	028	3	.673297	028	3	.679700	027
4	.653598	038	4	.660296	038	4	.666892	037	4	673390	037	4	.679791	036
5	.653695	048	5	.660391	047	5	.666986	047	5	.673482	046	5	.679882	045
6	.653791	058	6	.660486	057	6	.667079	056	6	.673574	055	6	.679973	055
7	.653888	067	7	.660581	067	7	.667173	065	7	673666	064	7	.680063	064
8	.653984	077	8	.660676	076	8	.667266	074	8	673758	074	8	.680154	073
9	.654080	087	9	.660771	086	9	.667359	084	9	.673850	083	9	.680245	082
4510	.654176	000	4580	.660865	000	4650	667453	000	4720	.673942	000	4790	.680335	000
1	.654273	010	1	.660960	009	1	.667546	009	1	.674034	009	1	.680426	009
2	.654369	019	2	.661055	019	2	.667640	019	2	.674126	018	2	.680517	018
3	.654465	029	3	.661150	028	3	667733	028	3	.674218	028	3	.680607	027
4	.654562	038	4	.661245	038	4	.667826	037	4	.674310	037	4	.680698	036
5	.654658	048	5	.661339	047	5	.667920	047	5	.674402	046	5	.680789	045
6	.654754	058	6	.661434	057	6	668013	056	6	.674494	055	6	.680879	055
7	.654850	067	7	661529	066	7	.668106	065	7	.674586	064	7	.680970	064
8	.654946	077	8	.661623	076	8	668199	074	8	.674677	074	8	.681060	073
9	.655042	086	9	.661718	085	9	.668293	084	9	.674769	083	9	.681151	082
4520	.655138	000	4590	.661813	000	4660	.668386	000	4730	.674861	000	4800	681241	000
1	.655234	010	1	.661907	009	1	.668479	009	1	.674953	009	1	681332	009
2	.655331	019	2	.662002	019	2	.668572	019	2	.675045	018	2	.681422	018
3	.655427	029	3	.662096	028	3	.668665	028	3	.675136	028	3	.681513	027
4	.655523	038	4	.662191	038	4	.668758	037	4	.675228	037	4	.681603	036
5	.655619	048	5	.662285	047	5	.668852	047	5	.675320	046	5	.681693	045
6	.655714	058	6	.662380	057	6	.668945	056	6	.675412	055	6	.681784	054
7	.655810	067	7	.662474	066	7	.669038	065	7	.675503	064	7	.681874	063
8	.655906	077	8	.662569	076	8	669131	074	8	.675595	074	8	.681964	072
9	656002	086	9	.662663	085	9	.669224	084	9	.675687	083	9	.682055	081
4530	.656098	000	4600	.662758	000	4670	.669317	000	4740	.675778	000	4810	682145	000
1	.656194	010	1	.662852	009	1	.669410	009	1	.675870	009	1	.682235	009
2	.656290	019	2	.662947	019	2	.669503	019	2	.675961	018	2	.682326	018
3	.656386	029	3	.663041	028	3	.669596	028	3	.676053	027	3	.682416	027
4	.656481	038	4	.663135	038	4	.669689	037	4	.676145	036	4	.682506	036
5	.656577	048	5	.663230	047	5	.669782	047	5	.676236	046	5	.682596	045
6	.656673	058	6	.663324	057	6	669875	056	6	.676328	055	6	.682686	054
7	.656769	067	7	.663418	066	7	.669967	065	7	.676419	064	7	.682777	063
8	.656864	077	8	.663512	076	8	.670060	074	8	.676511	073	8	.682867	072
9	.656960	086	9	.663607	085	9	.670153	084	9	.676602	082	9	.682957	081
4540	.657056	000	4610	.663701	000	4680	.670246	000	4750	.676694	000	4820	.683047	000
1	.657151	010	1	.663795	009	1	.670339	009	1	.676785	009	1	.683137	009
2	.657247	019	2	.663889	019	2	.670431	018	2	.676876	018	2	.683227	018
3	.657343	028	3	.663983	028	3	.670524	028	3	.676968	027	3	.683317	027
4	.657438	038	4	.664078	038	4	.670617	037	4	.677059	036	4	.683407	036
5	.657534	047	5	.664172	047	5	.670710	046	5	.677150	046	5	.683497	045
6	.657629	057	6	.664266	056	6	.670802	055	6	.677242	055	6	.683587	054
7	.657725	067	7	.664360	066	7	.670895	064	7	.677333	064	7	.683677	063
8	.657820	076	8	.664454	075	8	.670988	074	8	.677424	073	8	.683767	072
9	.657916	086	9	.664548	085	9	.671080	083	9	.677516	082	9	.683857	081
4550	.658011	000	4620	664642	000	4690	671173	000	4760	.677607	000	4830	.683947	000
1	.658107	010	1	.664736	009	1	.671265	009	1	.677698	009	1	.684037	009
2	.658202	019	2	664830	019	2	.671358	018	2	.677789	018	2	.684127	018
3	.658298	028	3	.664924	028	3	.671451	028	3	.677881	027	3	.684217	027
4	.658393	038	4	665018	038	4	.671543	037	4	.677972	036	4	.684307	036
5	.658488	047	5	665112	047	5	.671636	046	5	.678063	045	5	.684396	045
6	.658584	057	6	.665206	056	6	.671728	055	6	.678154	055	6	.684486	054
7	.658679	067	7	.665299	066	7	.671821	064	7	.678245	064	7	.684576	063
8	.658774	076	8	.665393	075	8	.671913	074	8	.678336	073	8	.684666	072
9	.658870	086	9	.665487	085	9	.672005	083	9	.678427	082	9	.684756	081
4560	.658965	000	4630	.665581	000	4700	672098	000	4770	.678518	000	4840	.684845	000
1	.659060	010	1	.665675	009	1	.672190	009	1	.678609	009	1	.684935	009
2	.659155	019	2	.665769	019	2	.672283	018	2	.678700	018	2	.685025	018
3	.659250	028	3	.665862	028	3	.672375	028	3	.678791	027	3	.685114	027
4	.659346	038	4	.665956	038	4	.672467	037	4	.678882	036	4	.685204	036
5	.659441	047	5	.666050	047	5	.672560	046	5	.678973	045	5	.685294	045
6	.659536	057	6	.666143	056	6	.672652	055	6	.679064	055	6	.685383	054
7	.659631	067	7	.666237	066	7	.672744	064	7	.679155	064	7	.685473	063
8	.659726	076	8	.666331	075	8	.672836	074	8	.679246	073	8	.685563	072
9	.659821	086	9	.666424	085	9	.672929	083	9	.679337	082	9	.685652	081

Log. .685742 to .715920 No. 4850 to 5199.

No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.
4850	.685742	00	4920	.691965	00	4990	.698100	00	5060	.704150	00	5130	.710117	00
1	.685831	09	1	.692053	09	1	.698188	09	1	.704236	09	1	.710202	08
2	.685921	18	2	.692142	18	2	.698275	17	2	.704322	17	2	.710287	17
3	.686010	27	3	.692230	27	3	.698362	26	3	.704408	26	3	.710371	25
4	.686100	36	4	.692318	35	4	.698448	35	4	.704494	34	4	.710456	34
5	.686189	45	5	.692406	44	5	.698535	44	5	.704579	43	5	.710540	42
6	.686279	54	6	.692494	53	6	.698622	52	6	.704665	52	6	.710625	51
7	.686368	63	7	.692583	62	7	.698709	61	7	.704751	60	7	.710710	59
8	.686457	72	8	.692671	71	8	.698796	70	8	.704837	69	8	.710794	68
9	.686547	81	9	.692759	80	9	.698883	79	9	.704922	77	9	.710879	76
4860	.686636	00	4930	.692847	00	5000	.698970	00	5070	.705008	00	5140	.710963	00
1	.686726	09	1	.692935	09	1	.699057	09	1	.705094	09	1	.711048	08
2	.686815	18	2	.693023	18	2	.699144	17	2	.705179	17	2	.711132	17
3	.686904	27	3	.693111	26	3	.699230	26	3	.705265	26	3	.711216	25
4	.686994	36	4	.693199	35	4	.699317	35	4	.705350	34	4	.711301	34
5	.687083	45	5	.693287	44	5	.699404	43	5	.705436	43	5	711385	42
6	.687172	54	6	.693375	53	6	.699491	52	6	.705522	52	6	.711470	51
7	.687261	63	7	.693463	62	7	.699578	61	7	.705607	60	7	.711554	59
8	.687351	72	8	.693551	70	8	.699664	70	8	.705693	69	8	.711638	68
9	.687440	81	9	.693639	79	9	.699751	78	9	705778	77	9	.711723	76
4870	.687529	00	4940	.693727	00	5010	.699838	00	5080	.705864	00	5150	.711807	00
1	.687618	09	1	.693815	09	1	.699924	09	1	.705949	09	1	.711891	08
2	.687707	18	2	.693903	18	2	.700011	17	2	.706035	17	2	.711976	17
3	.687796	27	3	.693991	26	3	.700098	26	3	.706120	26	3	.712060	25
4	.687885	36	4	.694078	35	4	.700184	35	4	.706205	34	4	.712144	34
5	.687975	45	5	.694166	44	5	.700271	43	5	.706291	43	5	.712229	42
6	.688064	54	6	.694254	53	6	.700357	52	6	.706376	51	6	.712313	51
7	.688153	62	7	.694342	62	7	.700444	61	7	.706462	60	7	.712397	59
8	.688242	72	8	.694430	70	8	.700531	70	8	.706547	68	8	.712481	68
9	.688331	80	9	.694517	79	9	.700617	78	9	.706632	77	9	.712565	76
4880	.688420	00	4950	.694605	00	5020	.700704	00	5090	.706718	00	5160	.712650	00
1	.688509	09	1	.694693	09	1	.700790	09	1	.706803	09	1	.712734	08
2	.688598	18	2	.694781	18	2	.700877	17	2	.706888	17	2	.712818	17
3	.688687	27	3	.694868	26	3	.700963	26	3	.706974	26	3	.712902	25
4	.688776	36	4	.694956	35	4	.701050	35	4	.707059	34	4	.712986	34
5	.688865	45	5	.695044	44	5	.701136	43	5	.707144	43	5	.713070	42
6	.688953	54	6	.695131	53	6	.701222	52	6	.707229	51	6	.713154	50
7	.689042	62	7	.695219	62	7	.701309	61	7	.707315	60	7	.713238	59
8	.689131	72	8	.695306	70	8	.701395	70	8	.707400	68	8	.713322	67
9	.689220	80	9	.695394	79	9	.701482	78	9	.707485	77	9	.713406	76
4890	.689309	00	4960	.695482	00	5030	.701568	00	5100	.707570	00	5170	.713490	00
1	.689398	09	1	.695569	09	1	.701654	09	1	.707655	09	1	.713574	08
2	.689486	18	2	.695657	17	2	.701741	17	2	.707740	17	2	.713658	17
3	.689575	27	3	695744	26	3	701827	26	3	.707826	26	3	.713742	25
4	.689664	36	4	.695832	35	4	.701913	35	4	.707911	34	4	.713826	34
5	.689753	45	5	.695919	44	5	.701999	43	5	.707996	43	5	.713910	42
6	.689841	54	6	.696007	52	6	.702086	52	6	.708081	51	6	.713994	50
7	.689930	62	7	.696094	61	7	.702172	61	7	.708166	60	7	.714078	59
8	.690019	72	8	.696182	70	8	.702258	70	8	.708251	68	8	.714162	67
9	.690107	80	9	.696269	79	9	.702344	78	9	.708336	77	9	.714246	76
4900	.690196	00	4970	.696356	00	5040	.702430	00	5110	.708421	00	5180	.714330	00
1	.690285	09	1	.696444	09	1	.702517	09	1	.708506	09	1	.714414	08
2	.690373	18	2	.696531	17	2	.702603	17	2	.708591	17	2	.714497	17
3	.690462	27	3	.696618	26	3	.702689	26	3	.708676	26	3	.714581	25
4	.690550	35	4	.696706	35	4	.702775	34	4	.708761	34	4	.714665	34
5	.690639	44	5	.696793	44	5	.702861	43	5	.708846	43	5	.714749	42
6	.690727	53	6	.696880	52	6	.702947	52	6	.708931	51	6	.714832	50
7	.690816	62	7	.696968	61	7	.703033	60	7	.709015	60	7	.714916	59
8	.690905	71	8	.697055	70	8	.703119	69	8	.709100	68	8	.715000	67
9	.690993	80	9	.697142	79	9	.703205	77	9	.709185	77	9	.715084	76
4910	.691081	00	4980	.697229	00	5050	.703291	00	5120	.709270	00	5190	.715167	00
1	.691170	09	1	.697316	09	1	.703377	09	1	.709355	08	1	.715251	08
2	.691258	18	2	.697404	17	2	.703463	17	2	.709440	17	2	.715335	17
3	.691347	27	3	.697491	26	3	.703549	26	3	.709524	25	3	.715418	25
4	.691435	35	4	.697578	35	4	.703635	34	4	.709609	34	4	.715502	34
5	.691523	44	5	.697665	44	5	.703721	43	5	.709694	42	5	.715586	42
6	.691612	53	6	.697752	52	6	.703807	52	6	.709779	51	6	.715669	50
7	.691700	62	7	.697839	61	7	.703893	60	7	.709863	59	7	.715753	59
8	.691788	71	8	.697926	70	8	.703979	69	8	.709948	68	8	.715836	67
9	.691877	80	9	.698013	79	9	.704065	77	9	.710033	76	9	.715920	76

Log. .716003 to .744215 No. 5200 to 5549.

No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.
5200	.716003	00	5270	.721811	00	5340	.727541	00	5410	.733197	00	5480	.738781	00
1	.716087	08	1	.721893	08	1	.727623	08	1	.733277	08	1	738860	08
2	.716170	17	2	.721975	16	2	.727704	16	2	.733358	16	2	.738939	16
3	.716254	25	3	.722058	25	3	.727785	24	3	.733438	24	3	.739018	24
4	.716337	34	4	.722140	33	4	.727866	33	4	.733518	32	4	.739097	32
5	.716421	42	5	.722222	41	5	.727948	41	5	.733598	40	5	.739177	40
6	.716504	50	6	722305	49	6	.728029	49	6	.733679	48	6	.739256	47
7	.716588	59	7	.722387	58	7	.728110	57	7	.733759	56	7	.739335	55
8	.716671	67	8	.722469	66	8	.728191	65	8	.733839	64	8	.739414	63
9	.716754	76	9	.722552	74	9	.728273	73	9	.733919	72	9	.739493	71
5210	.716838	00	5280	.722634	00	5350	.728354	00	5420	.733999	00	5490	.739572	00
1	.716921	08	1	.722716	08	1	.728435	08	1	.734079	08	1	.739651	08
2	.717004	17	2	.722798	16	2	.728516	16	2	.734159	16	2	.739730	16
3	.717088	25	3	.722881	25	3	.728597	24	3	.734240	24	3	.739810	24
4	.717171	33	4	.722963	33	4	728678	33	4	734320	32	4	.739889	32
5	.717254	42	5	.723045	41	5	.728759	41	5	734400	40	5	.739968	40
6	.717338	50	6	.723127	49	6	728841	49	6	.734480	48	6	.740047	47
7	.717421	58	7	.723209	58	7	.728922	57	7	734560	56	7	.740126	55
8	.717504	66	8	.723291	66	8	.729003	65	8	.734640	64	8	.740205	63
9	.717587	75	9	.723374	74	9	.729084	73	9	.734720	72	9	.740284	71
5220	.717670	00	5290	.723456	00	5360	.729165	00	5430	.734800	00	5500	.740363	00
1	.717754	08	1	.723538	08	1	729246	08	1	734880	08	1	.740442	08
2	.717837	17	2	.723620	16	2	.729327	16	2	734960	16	2	.740521	16
3	.717920	25	3	.723702	25	3	729408	24	3	735040	24	3	.740599	24
4	.718003	33	4	.723784	33	4	729489	32	4	.735120	32	4	.740678	32
5	.718086	42	5	.723866	41	5	729570	41	5	.735200	40	5	.740757	40
6	.718169	50	6	.723948	49	6	729651	49	6	735279	48	6	.740836	47
7	.718252	58	7	.724030	57	7	729732	57	7	.735359	56	7	.740915	55
8	.718336	66	8	.724112	66	8	729812	65	8	.735439	64	8	.740994	63
9	.718419	75	9	.724194	74	9	729893	73	9	.735519	72	9	.741073	71
5230	.718502	00	5300	.724276	00	5370	729974	00	5440	735599	00	5510	.741152	00
1	.718585	08	1	.724358	08	1	730055	08	1	.735679	08	1	.741230	08
2	.718668	17	2	.724440	16	2	.730136	16	2	735758	16	2	.741309	16
3	.718751	25	3	.724522	25	3	.730217	24	3	.735838	24	3	.741388	24
4	.718834	33	4	.724603	33	4	.730298	32	4	735918	32	4	.741467	32
5	.718917	42	5	.724685	41	5	.730378	40	5	.735998	40	5	.741545	40
6	.719000	50	6	.724767	49	6	.730459	49	6	.736078	48	6	.741624	47
7	.719083	58	7	.724849	57	7	.730540	57	7	736157	56	7	.741703	55
8	.719165	66	8	.724931	66	8	.730621	65	8	736237	64	8	.741782	63
9	.719248	75	9	.725013	74	9	.730701	73	9	736317	72	9	.741860	71
5240	.719331	00	5310	.725094	00	5380	.730782	00	5450	736396	00	5520	.741939	00
1	.719414	08	1	.725176	08	1	730863	08	1	736476	08	1	.742018	08
2	.719497	17	2	.725258	16	2	.730944	16	2	.736556	16	2	.742096	16
3	.719580	25	3	.725340	25	3	731024	24	3	.736635	24	3	.742175	23
4	.719663	33	4	.725422	33	4	.731105	32	4	.736715	32	4	.742254	31
5	.719745	41	5	.725503	41	5	.731186	40	5	.736795	40	5	.742332	39
6	.719828	50	6	.725585	49	6	.731266	49	6	.736874	48	6	.742411	47
7	.719911	58	7	.725667	57	7	.731347	57	7	.736954	56	7	.742489	55
8	.719994	66	8	.725748	66	8	.731428	65	8	737033	64	8	.742568	63
9	.720077	75	9	.725830	74	9	.731508	73	9	.737113	72	9	.742647	71
5250	.720159	00	5320	.725912	00	5390	.731589	00	5460	737193	00	5530	.742725	00
1	.720242	08	1	.725993	08	1	.731669	08	1	.737272	08	1	.742804	08
2	.720325	17	2	.726075	16	2	.731750	16	2	.737352	16	2	.742882	16
3	.720407	25	3	.726156	24	3	.731830	24	3	737431	24	3	.742961	23
4	.720490	33	4	.726238	33	4	731911	32	4	737511	32	4	.743039	31
5	.720573	41	5	.726320	41	5	.731991	40	5	737590	40	5	743118	39
6	.720655	50	6	.726401	49	6	.732072	48	6	.737670	48	6	.743196	47
7	.720738	58	7	.726483	57	7	.732152	56	7	.737749	56	7	.743274	55
8	.720821	66	8	.726564	65	8	.732233	64	8	.737828	64	8	.743353	63
9	.720903	75	9	.726646	73	9	.732313	72	9	.737908	72	9	.743431	71
5260	.720986	00	5330	.726727	00	5400	.732394	00	5470	.737987	00	5540	.743510	00
1	.721068	08	1	.726809	08	1	732474	08	1	.738067	08	1	.743588	08
2	.721151	16	2	.726890	16	2	.732555	16	2	.738146	16	2	.743666	16
3	.721233	25	3	.726972	24	3	.732635	24	3	.738225	24	3	.743745	23
4	.721316	33	4	.727053	33	4	.732715	32	4	.738305	32	4	.743823	31
5	.721398	41	5	.727134	41	5	.732796	40	5	.738384	40	5	.743902	39
6	.721481	49	6	727216	49	6	.732876	48	6	.738463	48	6	.743980	47
7	.721563	58	7	.727297	57	7	.732956	56	7	.738543	56	7	.744058	55
8	.721646	66	8	.727379	65	8	.733037	64	8	.738622	64	8	.744136	63
9	.721728	74	9	.727460	73	9	.733117	72	9	.738701	72	9	.744215	71

Log. .744293 to .770778 No. 5550 to 5899.

No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.
5550	.744293	00	5620	.749736	00	5690	.755112	00	5760	.760422	00	5830	.765669	00
1	.744371	08	1	.749814	08	1	.755189	08	1	.760498	08	1	.765743	07
2	744449	16	2	749891	16	2	.755265	15	2	.760573	15	2	.765817	15
3	744528	23	3	749968	23	3	.755341	23	3	.760649	23	3	.765892	22
4	744606	31	4	.750045	31	4	.755417	30	4	.760724	30	4	.765966	30
5	.744684	39	5	750122	39	5	.755494	38	5	.760799	38	5	.766041	37
6	.744762	47	6	.750200	47	6	.755570	46	6	.760875	45	6	.766115	45
7	.744840	55	7	.750277	54	7	.755646	53	7	.760950	53	7	.766190	52
8	744918	63	8	.750354	62	8	.755722	61	8	.761025	60	8	.766264	60
9	744997	71	9	.750431	70	9	.755799	69	9	.761100	68	9	.766338	67
5560	745075	00	5630	.750508	00	5700	.755875	00	5770	.761176	00	5840	.766413	00
1	.745153	08	1	750585	08	1	.755951	08	1	.761251	08	1	.766487	07
2	745231	16	2	750663	16	2	.756027	15	2	.761326	15	2	.766562	15
3	745309	23	3	.750740	23	3	.756103	23	3	.761402	23	3	.766636	22
4	745387	31	4	.750817	31	4	.756179	30	4	.761477	30	4	.766710	30
5	745465	39	5	.750894	39	5	.756256	38	5	.761552	38	5	.766784	37
6	.745543	47	6	.750971	47	6	.756332	46	6	.761627	45	6	.766859	45
7	.745621	55	7	.751048	54	7	756408	53	7	761702	53	7	.766933	52
8	.745699	62	8	.751125	62	8	.756484	61	8	.761777	60	8	.767007	60
9	.745777	70	9	751202	70	9	756560	69	9	.761853	68	9	.767082	67
5570	.745855	00	5640	.751279	00	5710	756636	00	5780	.761928	00	5850	.767156	00
1	.745933	08	1	.751356	08	1	.756712	08	1	.762003	08	1	.767230	07
2	.746011	16	2	.751433	15	2	756788	15	2	.762078	15	2	.767304	15
3	.746089	23	3	.751510	23	3	.756864	23	3	.762153	22	3	.767378	22
4	.746167	31	4	.751587	30	4	756940	30	4	.762228	30	4	.767453	30
5	746245	39	5	.751664	38	5	.757016	38	5	762303	38	5	.767527	37
6	746323	47	6	.751741	46	6	.757092	46	6	.762378	45	6	.767601	45
7	.746401	55	7	.751818	54	7	757168	53	7	.762453	52	7	.767675	52
8	.746478	62	8	.751895	62	8	.757244	61	8	.762528	60	8	.767749	59
9	746556	70	9	.751972	70	9	757320	69	9	.762603	68	9	.767823	67
5580	.746634	00	5650	.752048	00	5720	.757396	00	5790	.762679	00	5860	.767898	00
1	746712	08	1	.752125	08	1	.757472	08	1	.762754	08	1	.767972	07
2	.746790	16	2	.752202	15	2	.757548	15	2	.762829	15	2	.768046	15
3	.746868	23	3	.752279	23	3	.757624	23	3	.762903	22	3	.768120	22
4	.746945	31	4	.752356	30	4	.757700	30	4	.762978	30	4	.768194	30
5	.747023	39	5	.752433	38	5	.757775	38	5	.763053	38	5	.768268	37
6	.747101	47	6	.752509	46	6	.757851	46	6	.763128	45	6	.768342	45
7	747179	55	7	.752586	54	7	757927	53	7	.763203	52	7	.768416	52
8	.747256	62	8	.752663	62	8	758003	61	8	.763278	60	8	.768490	59
9	747334	70	9	.752740	70	9	.758079	68	9	.763353	68	9	.768564	67
5590	.747412	00	5660	.752816	00	5730	.758155	00	5800	.763428	00	5870	.768638	00
1	.747489	08	1	.752893	08	1	.758230	08	1	.763503	07	1	.768712	07
2	.747567	16	2	.752970	15	2	.758306	15	2	763578	15	2	.768786	15
3	.747645	23	3	.753047	23	3	.758382	23	3	763653	22	3	.768860	22
4	.747722	31	4	.753123	30	4	758458	30	4	.763727	30	4	.768934	30
5	.747800	39	5	.753200	38	5	.758533	38	5	.763802	37	5	.769008	37
6	.747878	47	6	.753277	46	6	.758609	46	6	.763877	45	6	.769082	45
7	.747955	54	7	.753353	54	7	758685	53	7	.763952	52	7	.769156	52
8	.748033	62	8	.753430	62	8	.758760	61	8	.764027	60	8	.769230	59
9	.748110	70	9	753506	70	9	.758836	68	9	.764101	67	9	.769303	67
5600	.748188	00	5670	.753583	00	5740	.758912	00	5810	.764176	00	5880	.769377	00
1	.748266	08	1	.753660	08	1	.758987	08	1	.764251	07	1	.769451	07
2	.748343	16	2	.753736	15	2	.759063	15	2	.764326	15	2	769525	15
3	.748421	23	3	.753813	23	3	759139	23	3	.764400	22	3	.769599	22
4	.748498	31	4	.753889	30	4	.759214	30	4	.764475	30	4	.769673	30
5	.748576	39	5	.753966	38	5	.759290	38	5	.764550	37	5	.769746	37
6	.748653	47	6	.754042	46	6	.759366	45	6	.764624	45	6	.769820	45
7	.748731	54	7	.754119	54	7	.759441	53	7	.764699	52	7	.769894	52
8	.748808	62	8	.754195	62	8	.759517	60	8	.764774	60	8	.769968	59
9	.748885	70	9	.754272	70	9	.759592	68	9	.764848	67	9	.770042	67
5610	.748963	00	5680	.754348	00	5750	.759668	00	5820	.764923	00	5890	.770115	00
1	.749040	08	1	.754425	08	1	.759743	08	1	.764998	07	1	.770189	07
2	.749118	16	2	.754501	15	2	.759819	15	2	.765072	15	2	.770263	15
3	.749195	23	3	754578	23	3	.759894	23	3	.765147	22	3	.770336	22
4	.749272	31	4	.754654	30	4	.759970	30	4	.765221	30	4	.770410	30
5	.749350	39	5	.754730	38	5	.760045	38	5	.765296	37	5	.770484	37
6	.749427	47	6	.754807	46	6	.760121	45	6	.765370	45	6	.770557	45
7	.749504	54	7	.754883	53	7	.760196	53	7	.765445	52	7	.770631	52
8	.749582	62	8	754960	61	8	.760272	60	8	.765519	60	8	.770705	59
9	.749659	70	9	.755036	69	9	.760347	68	9	.765594	67	9	.770778	67

Log. .770852 to .795810 No. 5900 to 6249.

No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.
5900	.770852	00	5970	.775974	00	6040	.781037	00	6110	.786041	00	6180	.790988	00
1	.770926	07	1	.776047	07	1	.781109	07	1	.786112	07	1	.791059	07
2	.770999	15	2	.776120	15	2	.781181	14	2	.786183	14	2	.791129	14
3	.771073	22	3	.776192	22	3	.781253	22	3	.786254	21	3	.791199	21
4	.771146	30	4	.776265	29	4	.781324	29	4	.786325	28	4	.791269	28
5	.771220	37	5	.776338	37	5	.781396	36	5	.786396	36	5	.791340	35
6	.771293	45	6	.776411	44	6	.781468	43	6	.786467	43	6	.791410	42
7	.771367	52	7	.776483	51	7	.781540	50	7	.786538	50	7	.791480	49
8	.771440	59	8	.776556	59	8	.781612	58	8	.786609	57	8	.791550	56
9	.771514	67	9	.776629	66	9	.781684	65	9	.786680	64	9	.791620	63
5910	.771587	00	5980	.776701	00	6050	.781755	00	6120	.786751	00	6190	.791691	00
1	.771661	07	1	.776774	07	1	.781827	07	1	.786822	07	1	.791761	07
2	.771734	15	2	.776846	14	2	.781899	14	2	.786893	14	2	.791831	14
3	.771808	22	3	.776919	22	3	.781971	22	3	.786964	21	3	.791901	21
4	.771881	30	4	.776992	29	4	.782042	29	4	.787035	28	4	.791971	28
5	.771955	37	5	.777064	36	5	.782114	36	5	.787106	36	5	.792041	35
6	.772028	44	6	.777137	43	6	.782186	43	6	.787177	43	6	.792111	42
7	.772102	52	7	.777209	51	7	.782258	50	7	.787248	50	7	.792181	49
8	.772175	59	8	.777282	58	8	.782329	58	8	.787319	57	8	.792252	56
9	.772248	67	9	.777354	65	9	.782401	65	9	.787390	64	9	.792322	63
5920	.772322	00	5990	.777427	00	6060	.782473	00	6130	.787460	00	6200	.792392	00
1	.772395	07	1	.777499	07	1	.782544	07	1	.787531	07	1	.792462	07
2	.772468	15	2	.777572	14	2	.782616	14	2	.787602	14	2	.792532	14
3	.772542	22	3	.777644	22	3	.782688	21	3	.787673	21	3	.792602	21
4	.772615	29	4	.777717	29	4	.782759	29	4	.787744	28	4	.792672	28
5	.772688	37	5	.777789	36	5	.782831	36	5	.787815	35	5	.792742	35
6	.772762	44	6	.777862	43	6	.782902	43	6	.787885	42	6	.792812	42
7	.772835	51	7	.777934	51	7	.782974	50	7	.787956	49	7	.792882	49
8	.772908	59	8	.778006	58	8	.783046	57	8	.788027	56	8	.792952	56
9	.772981	66	9	.778079	65	9	.783117	64	9	.788098	63	9	.793022	63
5930	.773055	00	6000	.778151	00	6070	.783189	00	6140	.788168	00	6210	.793092	00
1	.773128	07	1	.778224	07	1	.783260	07	1	.788239	07	1	.793161	07
2	.773201	15	2	.778296	14	2	.783332	14	2	.788310	14	2	.793231	14
3	.773274	22	3	.778368	22	3	.783403	21	3	.788380	21	3	.793301	21
4	.773347	29	4	.778441	29	4	.783475	29	4	.788451	28	4	.793371	28
5	.773421	37	5	.778513	36	5	.783546	36	5	.788522	35	5	.793441	35
6	.773494	44	6	.778585	43	6	.783618	43	6	.788593	42	6	.793511	42
7	.773567	51	7	.778658	51	7	.783689	50	7	.788663	49	7	.793581	49
8	.773640	59	8	.778730	58	8	.783761	57	8	.788734	56	8	.793651	56
9	.773713	66	9	.778802	65	9	.783832	64	9	.788804	63	9	.793721	63
5940	.773786	00	6010	.778874	00	6080	.783904	00	6150	.788875	00	6220	.793790	00
1	.773860	07	1	.778947	07	1	.783975	07	1	.788946	07	1	.793860	07
2	.773933	15	2	.779019	14	2	.784046	14	2	.789016	14	2	.793930	14
3	.774006	22	3	.779091	22	3	.784118	21	3	.789087	21	3	.794000	21
4	.774079	29	4	.779163	29	4	.784189	29	4	.789157	28	4	.794070	28
5	.774152	37	5	.779236	36	5	.784261	36	5	.789228	35	5	.794139	35
6	.774225	44	6	.779308	43	6	.784332	43	6	.789299	42	6	.794209	42
7	.774298	51	7	.779380	51	7	.784403	50	7	.789369	49	7	.794279	49
8	.774371	59	8	.779452	58	8	.784475	57	8	.789440	56	8	.794349	56
9	.774444	66	9	.779524	65	9	.784546	64	9	.789510	63	9	.794418	63
5950	.774517	00	6020	.779596	00	6090	.784617	00	6160	.789581	00	6230	.794488	00
1	.774590	07	1	.779669	07	1	.784689	07	1	.789651	07	1	.794558	07
2	.774663	15	2	.779741	14	2	.784760	14	2	.789722	14	2	.794627	14
3	.774736	22	3	.779813	22	3	.784831	21	3	.789792	21	3	.794697	21
4	.774809	29	4	.779885	29	4	.784902	29	4	.789863	28	4	.794767	28
5	.774882	37	5	.779957	36	5	.784974	36	5	.789933	35	5	.794836	35
6	.774955	44	6	.780029	43	6	.785045	43	6	.790003	42	6	.794906	42
7	.775028	51	7	.780101	50	7	.785116	50	7	.790074	49	7	.794976	49
8	.775100	59	8	.780173	58	8	.785187	57	8	.790144	56	8	.795045	56
9	.775173	66	9	.780245	65	9	.785259	64	9	.790215	63	9	.795115	63
5960	.775246	00	6030	.780317	00	6100	.785330	00	6170	.790285	00	6240	.795185	00
1	.775319	07	1	.780389	07	1	.785401	07	1	.790355	07	1	.795254	07
2	.775392	15	2	.780461	14	2	.785472	14	2	.790426	14	2	.795324	14
3	.775465	22	3	.780533	22	3	.785543	21	3	.790496	21	3	.795393	21
4	.775538	29	4	.780605	29	4	.785614	28	4	.790567	28	4	.795463	28
5	.775610	37	5	.780677	36	5	.785686	36	5	.790637	35	5	.795532	35
6	.775683	44	6	.780749	43	6	.785757	43	6	.790707	42	6	.795602	42
7	.775756	51	7	.780821	50	7	.785828	50	7	.790778	49	7	.795671	49
8	.775829	59	8	.780893	58	8	.785899	57	8	.790848	56	8	.795741	56
9	.775902	66	9	.780965	65	9	.785970	64	9	.790918	63	9	.795810	63

Log. .795880 to .819478 No. 6250 to 6599.

No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.
6250	.795880	00	6320	.800717	00	6390	.805501	00	6460	.810232	00	6530	.814913	00
1	.795949	07	1	.800786	07	1	.805569	07	1	.810300	07	1	.814980	07
2	.796019	14	2	.800854	14	2	.805637	14	2	.810367	13	2	.815046	13
3	.796088	21	3	.800923	21	3	.805705	20	3	.810434	20	3	.815113	20
4	796158	28	4	.800992	28	4	.805773	27	4	.810501	27	4	.815179	26
5	.796227	35	5	.801060	34	5	.805840	34	5	.810568	33	5	.815246	33
6	.796297	42	6	.801129	41	6	.805908	41	6	.810636	40	6	.815312	40
7	.796366	49	7	.801196	48	7	.805976	48	7	.810703	47	7	.815378	46
8	.796436	56	8	.801266	55	8	.806044	54	8	.810770	54	8	.815445	53
9	.796505	63	9	.801335	62	9	.806112	61	9	.810837	60	9	.815511	60
6260	.796574	00	6330	.801404	00	6400	.806180	00	6470	.810904	00	6540	.815578	00
1	.796644	07	1	.801472	07	1	.806248	07	1	.810971	07	1	.815644	07
2	.796713	14	2	.801541	14	2	.806316	14	2	.811038	13	2	.815710	13
3	.796782	21	3	.801609	21	3	.806383	20	3	.811106	20	3	.815777	20
4	.796852	27	4	.801678	27	4	.806451	27	4	.811173	27	4	.815843	26
5	.796921	35	5	.801747	34	5	.806519	34	5	.811240	33	5	.815910	33
6	.796990	42	6	.801815	41	6	806587	41	6	.811307	40	6	.815976	40
7	.797060	49	7	.801884	48	7	.806655	48	7	.811374	47	7	.816042	46
8	.797129	56	8	.801952	55	8	.806722	54	8	811441	54	8	.816109	53
9	.797198	62	9	.802021	62	9	806790	61	9	.811508	60	9	.816175	60
6270	.797267	00	6340	.802089	00	6410	.806858	00	6480	.811575	00	6550	.816241	00
1	.797337	07	1	.802158	07	1	806926	07	1	.811642	07	1	.816308	07
2	.797406	14	2	.802226	14	2	.806993	14	2	.811709	13	2	.816374	13
3	.797475	21	3	.802295	21	3	.807061	20	3	.811776	20	3	.816440	20
4	.797544	27	4	.802363	27	4	.807129	27	4	.811843	27	4	.816506	26
5	.797614	35	5	.802432	34	5	.807197	34	5	.811910	33	5	.816573	33
6	.797683	42	6	.802500	41	6	.807264	41	6	811977	40	6	.816639	40
7	.797752	49	7	.802568	48	7	.807332	48	7	.812044	47	7	.816705	46
8	.797821	56	8	802637	55	8	.807400	54	8	.812111	54	8	.816771	53
9	.797890	62	9	.802705	62	9	.807467	61	9	812178	60	9	.816838	60
6280	.797960	00	6350	.802774	00	6420	.807535	00	6490	.812245	00	6560	.816904	00
1	.798029	07	1	.802842	07	1	.807603	07	1	.812312	07	1	.816970	07
2	.798098	14	2	.802910	14	2	.807670	14	2	.812378	13	2	.817036	13
3	.798167	21	3	.802979	21	3	.807738	20	3	.812445	20	3	.817102	20
4	.798236	28	4	.803047	27	4	.807805	27	4	.812512	27	4	.817169	26
5	.798305	34	5	.803116	34	5	.807873	34	5	.812579	33	5	.817235	33
6	.798374	41	6	.803184	41	6	.807941	41	6	.812646	40	6	.817301	40
7	.798443	48	7	.803252	48	7	.808008	48	7	.812713	47	7	817367	46
8	.798512	55	8	.803320	55	8	.808076	54	8	.812780	54	8	.817433	53
9	.798582	62	9	.803389	62	9	.808143	61	9	.812846	60	9	.817499	59
6290	.798651	00	6360	.803457	00	6430	.808211	00	6500	.812913	00	6570	.817565	00
1	.798720	07	1	.803525	07	1	.808278	07	1	.812980	07	1	.817631	07
2	.798789	14	2	803594	14	2	.808346	14	2	813047	13	2	.817698	13
3	.798858	21	3	.803662	21	3	.808414	20	3	.813114	20	3	.817764	20
4	.798927	28	4	.803730	27	4	.808481	27	4	.813180	27	4	.817830	26
5	.798996	34	5	.803798	34	5	.808549	34	5	.813247	33	5	.817896	33
6	.799065	41	6	.803867	41	6	.808616	41	6	.813314	40	6	.817962	40
7	.799134	48	7	.803935	48	7	.808683	48	7	.813381	47	7	.818028	46
8	.799203	55	8	.804003	55	8	808751	54	8	.813447	54	8	.818094	53
9	.799272	62	9	.804071	62	9	.808818	61	9	.813514	60	9	.818160	59
6300	.799340	00	6370	.804139	00	6440	808886	00	6510	813581	00	6580	.818226	00
1	.799409	07	1	.804208	07	1	.808953	07	1	.813648	07	1	.818292	07
2	.799478	14	2	.804276	14	2	.809021	13	2	.813714	13	2	.818358	13
3	.799547	21	3	.804344	21	3	809088	20	3	.813781	20	3	.818424	20
4	.799616	28	4	.804412	27	4	.809155	27	4	.813848	27	4	.818490	26
5	799685	34	5	.804480	34	5	809223	34	5	.813914	33	5	.818556	33
6	.799754	41	6	.804548	41	6	.809290	40	6	.813981	40	6	.818622	40
7	.799823	48	7	.804616	48	7	.809358	47	7	814048	47	7	.818688	46
8	.799892	55	8	.804684	55	8	809425	54	8	.814114	54	8	.818754	53
9	.799960	62	9	.804753	62	9	.809492	61	9	.814181	60	9	.818819	59
6310	.800029	00	6380	.804821	00	6450	.809560	00	6520	.814248	00	6590	.818885	00
1	.800098	07	1	.804889	07	1	.809627	07	1	.814314	07	1	.818951	07
2	.800167	14	2	.804957	14	2	.809694	13	2	.814381	13	2	.819017	13
3	.800236	21	3	.805025	20	3	.809762	20	3	.814447	20	3	.819083	20
4	.800305	28	4	.805093	27	4	.809829	27	4	.814514	26	4	.819149	26
5	.800373	34	5	.805161	34	5	.809896	34	5	.814580	33	5	.819215	33
6	.800442	41	6	.805229	41	6	.809963	40	6	.814647	40	6	.819281	40
7	.800511	48	7	.805297	48	7	.810031	47	7	.814714	46	7	.819346	46
8	.800580	55	8	.805365	54	8	.810098	54	8	.814780	53	8	.819412	53
9	.800648	62	9	.805433	61	9	.810165	61	9	.814847	60	9	.819478	59

Log. .819544 to .841922 No. 6600 to 6949.

No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.
6600	.819544	00	6670	.824126	00	6740	.828660	00	6810	.833147	00	6880	.837588	00
1	.819610	07	1	.824191	06	1	.828724	06	1	.833211	06	1	.837652	06
2	.819675	13	2	.824256	13	2	.828789	13	2	.833275	13	2	.837715	13
3	.819741	20	3	.824321	19	3	.828853	19	3	.833338	19	3	.837778	19
4	.819807	26	4	.824386	26	4	.828918	26	4	.833402	26	4	.837841	25
5	.819873	33	5	.824451	32	5	.828982	32	5	.833466	32	5	.837904	32
6	.819939	40	6	.824516	39	6	.829046	39	6	.833530	38	6	.837967	38
7	.820004	46	7	.824581	45	7	.829111	45	7	.833593	45	7	.838030	44
8	.820070	53	8	.824646	52	8	.829175	52	8	.833657	51	8	.838093	50
9	.820136	59	9	.824711	58	9	.829239	58	9	.833721	58	9	.838156	57
6610	.820201	00	6680	.824776	00	6750	829304	00	6820	.833784	00	6890	.838219	00
1	.820267	07	1	.824841	06	1	829368	06	1	.833848	06	1	.838282	06
2	.820333	13	2	.824906	13	2	.829432	13	2	.833912	13	2	.838345	13
3	.820398	20	3	.824971	19	3	.829497	19	3	.833975	19	3	.838408	19
4	.820464	26	4	.825036	26	4	.829561	26	4	.834039	26	4	.838471	25
5	.820530	33	5	.825101	32	5	.829625	32	5	.834103	32	5	.838534	32
6	.820595	40	6	.825166	39	6	.829690	39	6	.834166	38	6	.838597	38
7	.820661	46	7	.825231	45	7	.829754	45	7	.834230	45	7	.838660	44
8	.820727	53	8	.825296	52	8	.829818	52	8	.834293	51	8	.838723	50
9	.820792	59	9	.825361	58	9	.829882	58	9	.834357	58	9	.838786	57
6620	.820858	00	6690	.825426	00	6760	.829947	00	6830	.834421	00	6900	.838849	00
1	.820924	07	1	.825491	06	1	.830011	06	1	.834484	06	1	.838912	06
2	.820989	13	2	.825556	13	2	.830075	13	2	.834548	13	2	.838975	13
3	.821055	20	3	.825621	19	3	.830139	19	3	.834611	19	3	.839038	19
4	.821120	26	4	.825686	26	4	.830204	26	4	.834675	25	4	.839101	25
5	.821186	33	5	.825751	32	5	.830268	32	5	.834738	32	5	.839164	31
6	.821251	40	6	.825815	39	6	.830332	38	6	.834802	38	6	.839227	38
7	.821317	46	7	.825880	45	7	830396	45	7	.834866	45	7	.839289	44
8	.821382	53	8	.825945	52	8	830460	51	8	.834929	51	8	.839352	50
9	.821448	59	9	.826010	58	9	.830524	58	9	.834993	58	9	.839415	57
6630	.821513	00	6700	.826075	00	6770	.830589	00	6840	.835056	00	6910	.839478	00
1	.821579	07	1	.826140	06	1	.830653	06	1	.835120	06	1	.839541	06
2	.821644	13	2	.826204	13	2	.830717	13	2	.835183	13	2	.839604	13
3	.821710	20	3	.826269	19	3	.830781	19	3	.835246	19	3	.839667	19
4	.821775	26	4	.826334	26	4	.830845	26	4	.835310	26	4	.839729	25
5	.821841	33	5	.826399	32	5	.830909	32	5	.835373	32	5	.839792	31
6	.821906	39	6	.826463	39	6	.830973	38	6	.835437	38	6	.839855	38
7	.821972	46	7	.826528	45	7	.831037	45	7	.835500	45	7	.839918	44
8	.822037	52	8	.826593	52	8	.831102	51	8	.835564	51	8	.839981	50
9	.822103	59	9	.826658	58	9	.831166	58	9	.835627	58	9	.840043	57
6640	.822168	00	6710	.826722	00	6780	.831230	00	6850	.835691	00	6920	.840106	00
1	.822233	07	1	.826787	06	1	.831294	06	1	.835754	06	1	.840169	06
2	.822299	13	2	.826852	13	2	.831358	13	2	.835817	13	2	.840232	13
3	.822364	20	3	.826917	19	3	.831422	19	3	.835881	19	3	.840294	19
4	.822430	26	4	.826981	26	4	.831486	26	4	.835944	26	4	.840357	25
5	.822495	33	5	.827046	32	5	.831550	32	5	.836007	32	5	.840420	31
6	.822560	39	6	.827111	39	6	.831614	38	6	.836071	38	6	.840482	38
7	.822626	46	7	.827175	45	7	.831678	45	7	.836134	45	7	.840545	44
8	.822691	52	8	.827240	52	8	.831742	51	8	.836197	51	8	.840608	50
9	.822756	59	9	.827305	58	9	.831806	58	9	.836261	58	9	.840671	57
6650	.822822	00	6720	.827369	00	6790	.831870	00	6860	.836324	00	6930	.840733	00
1	.822887	07	1	.827434	06	1	.831934	06	1	.836387	06	1	.840796	06
2	.822952	13	2	.827498	13	2	.831998	13	2	.836451	13	2	.840859	13
3	.823017	20	3	.827563	19	3	.832062	19	3	.836514	19	3	.840921	19
4	.823083	26	4	.827628	26	4	.832125	26	4	.836577	26	4	.840984	25
5	.823148	33	5	.827692	32	5	.832189	32	5	.836640	32	5	.841046	31
6	.823213	39	6	.827757	39	6	.832253	38	6	.836704	38	6	.841109	38
7	.823279	46	7	.827821	45	7	.832317	45	7	.836767	45	7	.841172	44
8	.823344	52	8	.827886	52	8	.832381	51	8	.836830	51	8	.841234	50
9	.823409	59	9	.827950	58	9	.832445	58	9	.836893	58	9	.841297	56
6660	.823474	00	6730	.828015	00	6800	.832509	00	6870	.836957	00	6940	.841359	00
1	.823539	07	1	.828080	06	1	.832573	06	1	.837020	06	1	.841422	06
2	.823605	13	2	.828144	13	2	.832637	13	2	.837083	13	2	.841485	13
3	.823670	20	3	.828209	19	3	.832700	19	3	.837146	19	3	.841547	19
4	.823735	26	4	.828273	26	4	.832764	26	4	.837209	25	4	.841610	25
5	.823800	33	5	.828338	32	5	.832828	32	5	.837273	32	5	.841672	31
6	.823865	39	6	.828402	39	6	.832892	38	6	.837336	38	6	.841735	38
7	.823930	46	7	.828466	45	7	.832956	45	7	.837399	44	7	.841797	44
8	.823996	52	8	.828531	52	8	.833019	51	8	.837462	51	8	.841860	50
9	.824061	59	9	.828595	58	9	.833083	58	9	.837525	57	9	.841922	56

Log. .841985 to .863263 No. 6950 to 7299.

No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.
6950	.841985	00	7020	.846337	00	7090	.850646	00	7160	.854913	00	7230	.859138	00
1	.842047	06	1	.846399	06	1	.850707	06	1	.854974	06	1	.859198	06
2	.842110	12	2	.846461	12	2	.850769	12	2	.855034	12	2	.859258	12
3	.842172	19	3	.846523	19	3	.850830	18	3	.855095	18	3	.859318	18
4	.842235	25	4	.846584	25	4	.850891	25	4	.855156	24	4	.859378	24
5	.842297	31	5	.846646	31	5	.850952	31	5	.855216	30	5	.859438	30
6	.842360	37	6	.846708	37	6	.851014	37	6	.855277	36	6	.859499	36
7	.842422	44	7	.846770	43	7	.851075	43	7	.855337	42	7	.859559	42
8	.842484	50	8	.846832	50	8	.851136	49	8	.855398	48	8	.859619	48
9	.842547	56	9	.846893	56	9	.851197	55	9	.855459	54	9	.859679	54
6960	.842609	00	7030	.846955	00	7100	.851258	00	7170	.855519	00	7240	.859739	00
1	.842672	06	1	.847017	06	1	.851319	06	1	.855580	06	1	.859798	06
2	.842734	12	2	.847079	12	2	.851381	12	2	.855640	12	2	.859858	12
3	.842796	19	3	.847141	19	3	.851442	18	3	.855701	18	3	.859918	18
4	.842859	25	4	.847202	25	4	.851503	25	4	.855761	24	4	.859978	24
5	.842921	31	5	.847264	31	5	.851564	31	5	.855822	30	5	.860038	30
6	.842983	37	6	.847326	37	6	.851625	37	6	.855882	36	6	.860098	36
7	.843046	44	7	.847388	43	7	.851686	43	7	.855943	42	7	.860158	42
8	.843108	50	8	.847449	50	8	.851747	49	8	.856003	48	8	.860218	48
9	.843170	56	9	.847511	56	9	.851808	55	9	.856064	54	9	.860278	54
6970	.843233	00	7040	.847573	00	7110	.851870	00	7180	.856124	00	7250	.860338	00
1	.843295	06	1	.847634	06	1	.851931	06	1	.856185	06	1	.860398	06
2	.843357	12	2	.847696	12	2	.851992	12	2	.856245	12	2	.860458	12
3	.843420	19	3	.847758	18	3	.852053	18	3	.856306	18	3	.860518	18
4	.843482	25	4	.847819	25	4	.852114	25	4	.856366	24	4	.860578	24
5	.843544	31	5	.847881	31	5	.852175	31	5	.856427	30	5	.860637	30
6	.843606	37	6	.847943	37	6	.852236	37	6	.856487	36	6	.860697	36
7	.843669	43	7	.848004	43	7	.852297	43	7	.856548	42	7	.860757	42
8	.843731	50	8	.848066	49	8	.852358	49	8	.856608	48	8	.860817	48
9	.843793	56	9	.848127	55	9	.852419	55	9	.856668	54	9	.860877	54
6980	.843855	00	7050	.848189	00	7120	.852480	00	7190	.856729	00	7260	.860937	00
1	.843918	06	1	.848251	06	1	.852541	06	1	.856789	06	1	.860996	06
2	.843980	12	2	.848312	12	2	.852602	12	2	.856850	12	2	.861056	12
3	.844042	19	3	.848374	18	3	.852663	18	3	.856910	18	3	.861116	18
4	.844104	25	4	.848435	25	4	.852724	24	4	.856970	24	4	.861176	24
5	.844166	31	5	.848497	31	5	.852785	30	5	.857031	30	5	.861236	30
6	.844229	37	6	.848559	37	6	.852846	37	6	.857091	36	6	.861295	36
7	.844291	43	7	.848620	43	7	.852907	43	7	.857151	42	7	.861355	42
8	.844353	50	8	.848682	49	8	.852968	49	8	.857212	48	8	.861415	48
9	.844415	56	9	.848743	55	9	.853029	55	9	.857272	54	9	.861475	54
6990	.844477	00	7060	.848805	00	7130	.853089	00	7200	.857332	00	7270	.861534	00
1	.844539	06	1	.848866	06	1	.853150	06	1	.857393	06	1	.861594	06
2	.844601	12	2	.848928	12	2	.853211	12	2	.857453	12	2	.861654	12
3	.844663	19	3	.848989	18	3	.853272	18	3	.857513	18	3	.861714	18
4	.844726	25	4	.849051	25	4	.853333	24	4	.857574	24	4	.861773	24
5	.844788	31	5	.849112	31	5	.853394	30	5	.857634	30	5	.861833	30
6	.844850	37	6	.849174	37	6	.853455	37	6	.857694	36	6	.861893	36
7	.844912	43	7	.849235	43	7	.853516	43	7	.857754	42	7	.861952	42
8	.844974	50	8	.849296	49	8	.853576	49	8	.857815	48	8	.862012	48
9	.845036	56	9	.849358	55	9	.853637	55	9	.857875	54	9	.862072	54
7000	.845098	00	7070	.849419	00	7140	.853698	00	7210	.857935	00	7280	.862131	00
1	.845160	06	1	.849481	06	1	.853759	06	1	.857995	06	1	.862191	06
2	.845222	12	2	.849542	12	2	.853820	12	2	.858056	12	2	.862251	12
3	.845284	19	3	.849604	18	3	.853881	18	3	.858116	18	3	.862310	18
4	.845346	25	4	.849665	25	4	.853941	24	4	.858176	24	4	.862370	24
5	.845408	31	5	.849726	31	5	.854002	30	5	.858236	30	5	.862430	30
6	.845470	37	6	.849788	37	6	.854063	37	6	.858296	36	6	.862489	36
7	.845532	43	7	.849849	43	7	.854124	43	7	.858357	42	7	.862549	42
8	.845594	50	8	.849911	49	8	.854184	49	8	.858417	48	8	.862608	48
9	.845656	56	9	.849972	55	9	.854245	55	9	.858477	54	9	.862668	54
7010	.845718	00	7080	.850033	00	7150	.854306	00	7220	.858537	00	7290	.862727	00
1	.845780	06	1	.850095	06	1	.854367	06	1	.858597	06	1	.862787	06
2	.845842	12	2	.850156	12	2	.854427	12	2	.858657	12	2	.862847	12
3	.845904	19	3	.850217	18	3	.854488	18	3	.858718	18	3	.862906	18
4	.845966	25	4	.850279	25	4	.854549	24	4	.858778	24	4	.862966	24
5	.846028	31	5	.850340	31	5	.854610	30	5	.858838	30	5	.863025	30
6	.846090	37	6	.850401	37	6	.854670	36	6	.858898	36	6	.863085	36
7	.846151	43	7	.850462	43	7	.854731	42	7	.858958	42	7	.863144	42
8	.846213	50	8	.850524	49	8	.854792	48	8	.859018	48	8	.863204	48
9	.846275	56	9	.850585	55	9	.854852	54	9	.859078	54	9	.863263	54

Log. .863323 to .883605 No. 7300 to 7649.

No.	Log.	Part.	No.	Log.	Part.	No	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.
7300	.863323	00	7370	.867467	00	7440	.871573	00	7510	.875640	00	7580	879669	00
1	.863382	06	1	.867526	06	1	.871631	06	1	.875698	06	1	879726	06
2	.863442	12	2	.867585	12	2	.871690	12	2	.875756	12	2	.879784	11
3	.863501	18	3	.867644	18	3	.871748	18	3	.875813	17	3	.879841	17
4	.863561	24	4	.867703	24	4	.871806	23	4	.875871	23	4	.879898	23
5	.863620	30	5	.867762	29	5	.871865	29	5	.875929	29	5	.879956	28
6	.863680	36	6	.867821	35	6	.871923	35	6	.875987	35	6	.880013	34
7	.863739	42	7	.867880	41	7	.871981	41	7	.876045	41	7	.880070	40
8	.863798	48	8	.867939	47	8	.872040	47	8	.876102	46	8	.880127	46
9	.863858	54	9	.867997	53	9	.872098	53	9	.876160	52	9	.880185	51
7310	.863917	00	7380	.868056	00	7450	.872156	00	7520	.876218	00	7590	.880242	00
1	.863977	06	1	.868115	06	1	.872215	06	1	.876276	06	1	.880299	06
2	.864036	12	2	.868174	12	2	.872273	12	2	.876333	12	2	.880356	11
3	.864096	18	3	.868233	18	3	.872331	18	3	.876391	17	3	.880413	17
4	.864155	24	4	.868292	24	4	.872389	23	4	.876449	23	4	.880471	23
5	.864214	30	5	.868350	29	5	.872448	29	5	.876506	29	5	.880528	28
6	.864274	36	6	.868409	35	6	.872506	35	6	.876564	34	6	.880585	34
7	.864333	42	7	.868468	41	7	.872564	41	7	.876622	40	7	.880642	40
8	.864392	48	8	.868527	47	8	.872622	47	8	.876680	46	8	.880699	46
9	.864452	54	9	.868586	53	9	.872681	53	9	.876737	52	9	.880756	51
7320	.864511	00	7390	.868644	00	7460	.872739	00	7530	.876795	00	7600	.880814	00
1	.864570	06	1	.868703	06	1	.872797	06	1	.876853	06	1	.880871	06
2	.864630	12	2	.868762	12	2	.872855	12	2	.876910	12	2	.880928	11
3	.864689	18	3	.868821	18	3	.872913	18	3	.876968	17	3	.880985	17
4	.864748	24	4	.868879	24	4	.872972	23	4	.877026	23	4	.881042	23
5	.864808	30	5	.868938	29	5	.873030	29	5	.877083	29	5	.881099	28
6	.864867	36	6	.868997	35	6	.873088	35	6	.877141	34	6	.881156	34
7	.864926	42	7	.869056	41	7	.873146	41	7	.877198	40	7	.881213	40
8	.864985	48	8	.869114	47	8	.873204	47	8	.877256	46	8	.881270	46
9	865045	54	9	.869173	53	9	.873262	53	9	.877314	52	9	.881328	51
7330	.865104	00	7400	.869232	00	7470	.873321	00	7540	.877371	00	7610	.881385	00
1	.865163	06	1	.869290	06	1	.873379	06	1	877429	06	1	.881442	06
2	.865222	12	2	.869349	12	2	.873437	12	2	.877486	12	2	.881499	11
3	.865282	18	3	.869408	18	3	.873495	18	3	877544	17	3	.881556	17
4	865341	24	4	.869466	24	4	.873553	23	4	.877602	23	4	.881613	23
5	.865400	30	5	.869525	29	5	.873611	29	5	.877659	29	5	.881670	28
6	865459	36	6	.869584	35	6	.873669	35	6	.877717	34	6	.881727	34
7	865518	42	7	.869642	41	7	.873727	41	7	.877774	40	7	.881784	40
8	865578	48	8	.869701	47	8	.873785	47	8	.877832	46	8	.881841	46
9	.865637	54	9	.869760	53	9	.873843	53	9	877889	52	9	.881898	51
7340	.865696	00	7410	.869818	00	7480	.873902	00	7550	.877947	00	7620	.881955	00
1	865755	06	1	869877	06	1	.873960	06	1	.878004	06	1	.882012	06
2	.865814	12	2	.869935	12	2	.874018	12	2	.878062	12	2	.882069	11
3	865873	18	3	869994	18	3	.874076	17	3	.878119	17	3	.882126	17
4	.865933	24	4	870053	24	4	.874134	23	4	.878177	23	4	.882183	23
5	.865992	30	5	870111	29	5	.874192	29	5	.878234	29	5	.882240	28
6	.866051	36	6	870170	35	6	.874250	35	6	.878292	34	6	.882297	34
7	.866110	42	7	870228	41	7	.874308	41	7	.878349	40	7	.882354	40
8	.866169	48	8	.870287	47	8	.874366	46	8	.878407	46	8	.882411	46
9	866228	54	9	870345	53	9	.874424	52	9	.878464	52	9	.882468	51
7350	.866287	00	7420	.870404	00	7490	.874482	00	7560	.878522	00	7630	.882524	00
1	866346	06	1	.870462	06	1	.874540	06	1	.878579	06	1	.882581	06
2	.866405	12	2	.870521	12	2	.874598	12	2	.878637	12	2	.882638	11
3	866465	18	3	.870579	18	3	.874656	17	3	.878694	17	3	.882695	17
4	.866524	24	4	870638	24	4	.874714	23	4	.878751	23	4	.882752	23
5	.866583	30	5	.870696	29	5	874772	29	5	.878809	29	5	.882809	28
6	866642	35	6	.870755	35	6	.874830	35	6	.878866	34	6	.882866	34
7	.866701	41	7	.870813	41	7	.874887	41	7	.878924	40	7	.882923	40
8	.866760	47	8	.870872	47	8	.874945	46	8	.878981	46	8	.882980	46
9	.866819	53	9	.870930	53	9	.875003	52	9	.879038	52	9	.883036	51
7360	866878	00	7430	.870989	00	7500	.875061	00	7570	.879096	00	7640	.883093	00
1	.866937	06	1	.871047	06	1	.875119	06	1	.879153	06	1	.883150	06
2	.866996	12	2	.871106	12	2	.875177	12	2	.879211	12	2	.883207	11
3	.867055	18	3	.871164	18	3	.875235	17	3	.879268	17	3	.883264	17
4	.867114	24	4	.871223	24	4	.875293	23	4	.879325	23	4	.883321	23
5	.867173	29	5	.871281	29	5	.875351	29	5	.879383	29	5	.883377	28
6	867232	35	6	.871339	35	6	.875409	35	6	.879440	34	6	883434	34
7	867291	41	7	.871398	41	7	.875466	41	7	.879497	40	7	.883491	40
8	.867350	47	8	.871456	47	8	.875524	46	8	.879555	46	8	.883548	46
9	.867409	53	9	.871515	53	9	.875582	52	9	.879612	52	9	.883605	51

Log. .883661 to .903036 No. 7650 to 7999.

No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.
7650	.883661	00	7720	.887617	00	7790	.891537	00	7860	.895422	00	7930	.899273	00
1	.883718	06	1	.887674	06	1	.891593	06	1	.895478	06	1	.899328	05
2	.883775	11	2	.887730	11	2	.891649	11	2	.895533	11	2	.899383	11
3	.883832	17	3	.887786	17	3	.891705	17	3	.895588	17	3	.899437	17
4	.883888	23	4	.887842	23	4	.891760	22	4	.895643	22	4	.899492	22
5	.883945	28	5	.887898	28	5	.891816	28	5	.895699	27	5	.899547	27
6	.884002	34	6	.887955	34	6	.891872	33	6	.895754	33	6	.899602	33
7	.884059	40	7	.888011	39	7	.891927	39	7	895809	39	7	.899656	38
8	.884115	46	8	.888067	45	8	.891983	44	8	895864	44	8	.899711	44
9	.884172	51	9	.888123	51	9	.892039	50	9	895919	50	9	.899766	50
7660	.884229	00	7730	.888179	00	7800	.892095	00	7870	.895975	00	7940	.899820	00
1	.884285	06	1	.888236	06	1	.892150	06	1	.896030	06	1	.899875	05
2	.884342	11	2	.888292	11	2	.892206	11	2	.896085	11	2	.899930	11
3	.884399	17	3	.888348	17	3	.892262	17	3	.896140	17	3	.899985	17
4	.884455	23	4	.888404	22	4	.892317	22	4	.896195	22	4	.900039	22
5	.884512	28	5	.888460	28	5	.892373	28	5	.896251	27	5	.900094	27
6	.884569	34	6	.888516	34	6	.892428	33	6	.896306	33	6	.900149	33
7	.884625	40	7	.888573	39	7	.892484	39	7	896361	39	7	.900203	38
8	.884682	46	8	.888629	45	8	.892540	44	8	896416	44	8	.900258	44
9	.884739	51	9	.888685	50	9	.892595	50	9	.896471	50	9	.900312	50
7670	.884795	00	7740	.888741	00	7810	.892651	00	7880	.896526	00	7950	.900367	00
1	.884852	06	1	.888797	06	1	.892707	06	1	.896581	06	1	.900422	05
2	.884909	11	2	.888853	11	2	.892762	11	2	.896636	11	2	.900476	11
3	.884965	17	3	.888909	17	3	892818	17	3	.896691	17	3	.900531	17
4	.885022	23	4	.888965	22	4	.892873	22	4	896747	22	4	.900586	22
5	.885078	28	5	.889021	28	5	.892929	28	5	.896802	27	5	.900640	27
6	.885135	34	6	.889077	34	6	.892985	33	6	.896857	33	6	.900695	33
7	.885191	40	7	.889134	39	7	.893040	39	7	.896912	39	7	.900749	38
8	.885248	46	8	.889190	45	8	.893096	44	8	.896967	44	8	.900804	44
9	.885305	51	9	.889246	50	9	.893151	50	9	.897022	50	9	.900858	50
7680	.885361	00	7750	.889302	00	7820	893207	00	7890	.897077	00	7960	.900913	00
1	.885418	06	1	.889358	06	1	.893262	06	1	.897132	06	1	.900968	05
2	.885474	11	2	.889414	11	2	.893318	11	2	.897187	11	2	.901022	11
3	.885531	17	3	.889470	17	3	893373	17	3	.897242	17	3	.901077	16
4	.885587	23	4	.889526	22	4	.893429	22	4	.897297	22	4	.901131	22
5	.885644	28	5	.889582	28	5	.893484	28	5	.897352	27	5	.901186	27
6	.885700	34	6	.889638	34	6	.893540	33	6	.897407	33	6	.901240	33
7	.885757	39	7	.889694	39	7	.893595	39	7	.897462	39	7	.901295	38
8	.885813	45	8	.889750	45	8	.893651	44	8	.897517	44	8	.901349	44
9	.885870	51	9	.889806	50	9	.893706	50	9	.897572	50	9	.901404	49
7690	.885926	00	7760	.889862	00	7830	.893762	00	7900	.897627	00	7970	.901458	00
1	.885983	06	1	.889918	06	1	.893817	06	1	.897682	06	1	901513	05
2	.886039	11	2	.889974	11	2	.893873	11	2	.897737	11	2	.901567	11
3	.886096	17	3	.890030	17	3	.893928	17	3	.897792	17	3	.901622	16
4	.886152	23	4	.890085	22	4	.893984	22	4	.897847	22	4	.901676	22
5	.886209	28	5	.890141	28	5	.894039	28	5	.897902	27	5	.901731	27
6	.886265	34	6	.890197	34	6	.894094	33	6	.897957	33	6	.901785	33
7	.886321	39	7	.890253	39	7	.894150	39	7	.898012	39	7	.901840	38
8	.886378	45	8	.890309	45	8	.894205	44	8	.898067	44	8	.901894	44
9	.886434	51	9	.890365	50	9	.894261	50	9	.898122	50	9	.901948	49
7700	.886491	00	7770	.890421	00	7840	.894316	00	7910	.898176	00	7980	.902003	00
1	.886547	06	1	.890477	06	1	.894371	06	1	898231	06	1	.902057	05
2	.886603	11	2	.890533	11	2	.894427	11	2	898286	11	2	.902112	11
3	.886660	17	3	.890589	17	3	.894482	17	3	898341	17	3	.902166	16
4	.886716	23	4	.890644	22	4	.894538	22	4	898396	22	4	.902220	22
5	.886773	28	5	.890700	28	5	.894593	27	5	.898451	27	5	.902275	27
6	.886829	34	6	.890756	34	6	.894648	33	6	.898506	33	6	.902329	33
7	.886885	39	7	.890812	39	7	.894704	39	7	.898561	39	7	.902384	38
8	.886942	45	8	.890868	45	8	.894759	44	8	.898615	44	8	.902438	44
9	.886998	51	9	.890924	50	9	.894814	50	9	.898670	50	9	.902492	49
7710	.887054	00	7780	.890980	00	7850	.894870	00	7920	898725	00	7990	.902547	00
1	.887111	06	1	.891035	06	1	.894925	06	1	898780	05	1	.902601	05
2	.887167	11	2	.891091	11	2	.894980	11	2	.898835	11	2	.902655	11
3	.887223	17	3	.891147	17	3	.895036	17	3	.898890	17	3	.902710	16
4	.887280	23	4	.891203	22	4	.895091	22	4	.898944	22	4	.902764	22
5	.887336	28	5	.891259	28	5	.895146	27	5	.898999	27	5	.902818	27
6	.887392	34	6	.891314	34	6	.895201	33	6	.899054	33	6	.902873	33
7	.887448	39	7	.891370	39	7	.895257	39	7	.899109	38	7	.902927	38
8	.887505	45	8	.891426	45	8	.895312	44	8	.899164	44	8	.902981	44
9	.887561	51	9	.891482	50	9	.895367	50	9	.899218	50	9	.903036	49

Log. .903090 to .921634 No. 8000 to 8349.

No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No	Log.	Part.
8000	.903090	00	8070	.906873	00	8140	.910624	00	8210	.914343	00	8280	.918030	00
1	.903144	05	1	.906927	05	1	.910678	05	1	.914396	05	1	.918083	05
2	.903198	11	2	.906981	11	2	.910731	11	2	.914449	11	2	.918135	11
3	.903253	16	3	.907035	16	3	.910784	16	3	.914502	16	3	.918188	16
4	.903307	22	4	.907089	22	4	.910838	21	4	.914555	21	4	.918240	21
5	.903361	27	5	.907142	27	5	.910891	27	5	.914608	27	5	.918292	26
6	.903416	32	6	.907196	32	6	.910944	32	6	.914660	32	6	.918345	31
7	.903470	38	7	.907250	38	7	.910998	37	7	.914713	37	7	.918397	37
8	.903524	43	8	.907304	43	8	.911051	43	8	.914766	42	8	.918450	42
9	.903578	49	9	.907358	49	9	.911104	48	9	.914819	48	9	.918502	47
8010	.903632	00	8080	.907411	00	8150	.911158	00	8220	.914872	00	8290	.918554	00
1	.903687	05	1	.907465	05	1	.911211	05	1	.914925	05	1	.918607	05
2	.903741	11	2	.907519	11	2	.911264	11	2	.914977	11	2	.918659	11
3	.903795	16	3	.907573	16	3	.911317	16	3	.915030	16	3	.918712	16
4	.903849	22	4	.907626	22	4	.911371	21	4	.915083	21	4	.918764	21
5	.903903	27	5	.907680	27	5	.911424	27	5	.915136	27	5	.918816	26
6	.903958	32	6	.907734	32	6	.911477	32	6	.915189	32	6	.918869	31
7	.904012	38	7	.907787	38	7	.911530	37	7	.915241	37	7	.918921	37
8	.904066	43	8	.907841	43	8	.911584	42	8	.915294	42	8	.918973	42
9	.904120	49	9	.907895	49	9	.911637	48	9	.915347	48	9	.919026	47
8020	.904174	00	8090	.907948	00	8160	.911690	00	8230	.915400	00	8300	.919078	00
1	.904228	05	1	.908002	05	1	.911743	05	1	.915453	05	1	.919130	05
2	.904283	11	2	.908056	11	2	.911797	11	2	.915505	11	2	.919183	11
3	.904337	16	3	.908109	16	3	911850	16	3	.915558	16	3	.919235	16
4	.904391	22	4	.908163	22	4	.911903	21	4	.915611	21	4	.919287	21
5	.904445	27	5	.908217	27	5	911956	27	5	.915664	27	5	.919340	26
6	.904499	32	6	.908270	32	6	.912009	32	6	.915716	32	6	.919392	31
7	.904553	38	7	.908324	38	7	.912063	37	7	.915769	37	7	.919444	37
8	.904607	43	8	.908378	43	8	.912116	42	8	.915822	42	8	.919496	42
9	.904661	49	9	.908431	49	9	.912169	48	9	.915874	48	9	.919549	47
8030	.904715	00	8100	.908485	00	8170	.912222	00	8240	.915927	00	8310	.919601	00
1	.904770	05	1	.908539	05	1	.912275	05	1	.915980	05	1	.919653	05
2	.904824	11	2	.908592	11	2	.912328	11	2	.916033	11	2	.919705	11
3	.904878	16	3	.908646	16	3	.912381	16	3	.916085	16	3	.919758	16
4	.904932	22	4	.908699	21	4	.912435	21	4	.916138	21	4	.919810	21
5	.904986	27	5	.908753	27	5	.912488	27	5	.916191	27	5	.919862	26
6	.905040	32	6	908807	32	6	.912541	32	6	.916243	32	6	.919914	31
7	.905094	38	7	.908860	37	7	.912594	37	7	.916296	37	7	.919967	37
8	.905148	43	8	.908914	43	8	.912647	42	8	.916349	42	8	.920019	42
9	.905202	49	9	.908967	48	9	.912700	48	9	.916401	48	9	.920071	47
8040	.905256	00	8110	.909021	00	8180	.912753	00	8250	916454	00	8320	.920123	00
1	.905310	05	1	.909074	05	1	.912806	05	1	.916507	05	1	.920175	05
2	.905364	11	2	.909128	11	2	.912859	11	2	.916559	11	2	.920228	10
3	.905418	16	3	.909181	16	3	.912913	16	3	.916612	16	3	.920280	16
4	.905472	22	4	.909235	21	4	.912966	21	4	.916664	21	4	.920332	21
5	.905526	27	5	.909288	27	5	.913019	27	5	.916717	26	5	.920384	26
6	905580	32	6	.909342	32	6	.913072	32	6	.916770	31	6	.920436	31
7	.905634	38	7	.909395	37	7	.913125	37	7	.916822	37	7	.920489	36
8	.905688	43	8	.909449	43	8	.913178	42	8	.916875	42	8	.920541	42
9	.905742	49	9	.909502	48	9	.913231	48	9	.916927	47	9	.920593	47
8050	.905796	00	8120	.909556	00	8190	.913284	00	8260	.916980	00	8330	.920645	00
1	.905850	05	1	.909609	05	1	.913337	05	1	.917033	05	1	920697	05
2	.905904	11	2	.909663	11	2	.913390	11	2	.917085	11	2	.920749	10
3	.905958	16	3	.909716	16	3	.913443	16	3	.917138	16	3	.920801	16
4	.906012	22	4	.909770	21	4	.913496	21	4	.917190	21	4	.920853	21
5	.906065	27	5	.909823	27	5	.913549	27	5	.917243	26	5	.920906	26
6	.906119	32	6	.909877	32	6	.913602	32	6	.917295	31	6	.920958	31
7	.906173	38	7	.909930	37	7	.913655	37	7	.917348	37	7	.921010	36
8	.906227	43	8	.909984	43	8	.913708	42	8	.917400	42	8	.921062	42
9	.906281	49	9	.910037	48	9	.913761	48	9	.917453	47	9	.921114	47
8060	.906335	00	8130	.910090	00	8200	.913814	00	8270	.917505	00	8340	.921166	00
1	.906389	05	1	.910144	05	1	.913867	05	1	.917558	05	1	.921218	05
2	.906443	11	2	.910197	11	2	.913920	11	2	.917610	11	2	.921270	10
3	.906497	16	3	.910251	16	3	.913973	16	3	.917663	16	3	.921322	16
4	.906550	22	4	.910304	21	4	.914026	21	4	.917715	21	4	.921374	21
5	.906604	27	5	.910358	27	5	.914079	27	5	.917768	26	5	.921426	26
6	.906658	32	6	.910411	32	6	.914131	32	6	.917820	31	6	.921478	31
7	.906712	38	7	.910464	37	7	.914184	37	7	.917873	37	7	.921530	36
8	.906766	43	8	.910518	43	8	.914237	42	8	.917925	42	8	.921582	42
9	.906820	49	9	.910571	48	9	.914290	48	9	.917978	47	9	.921634	47

Log. .921686 to .939469 No. 8350 to 8699.

No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.
8350	.921686	00	8420	.925312	00	8490	.928906	00	8560	.932474	00	8630	.936011	00
1	.921738	05	1	.925364	05	1	.928959	05	1	.932524	05	1	.936061	05
2	.921790	10	2	.925415	10	2	.929010	10	2	.932575	10	2	.936111	10
3	.921842	16	3	.925467	15	3	.929061	15	3	.932626	15	3	.936162	15
4	.921894	21	4	.925518	21	4	.929112	20	4	.932677	20	4	.936212	20
5	.921946	26	5	.925570	26	5	.929163	26	5	.932727	25	5	.936262	25
6	.921998	31	6	.925621	31	6	.929214	31	6	.932778	30	6	.936313	30
7	.922050	36	7	.925673	36	7	.929266	36	7	.932829	35	7	.936363	35
8	922102	42	8	.925724	41	8	.929317	41	8	.932879	40	8	.936413	40
9	.922154	47	9	.925776	46	9	.929368	46	9	.932930	45	9	.936463	45
8360	.922206	00	8430	.925828	00	8500	.929419	00	8570	.932981	00	8640	.936514	00
1	.922258	05	1	.925879	05	1	.929470	05	1	.933031	05	1	.936564	05
2	.922310	10	2	.925931	10	2	.929521	10	2	.933082	10	2	.936614	10
3	.922362	16	3	925982	15	3	.929572	15	3	.933133	15	3	.936664	15
4	.922414	21	4	.926034	21	4	.929623	20	4	.933183	20	4	.936715	20
5	922466	26	5	.926085	26	5	.929674	26	5	.933234	25	5	.936765	25
6	.922518	31	6	.926137	31	6	.929725	31	6	.933285	30	6	.936815	30
7	.922570	36	7	.926188	36	7	.929776	36	7	.933335	35	7	.936865	35
8	.922622	42	8	.926239	41	8	.929827	41	8	.933386	40	8	.936916	40
9	.922674	47	9	.926291	46	9	.929878	46	9	.933437	45	9	.936966	45
8370	.922725	00	8440	.926342	00	8510	.929930	00	8580	.933487	00	8650	.937016	00
1	.922777	05	1	.926394	05	1	.929981	05	1	.933538	05	1	.937066	05
2	.922829	10	2	.926445	10	2	.930032	10	2	.933588	10	2	.937116	10
3	.922881	16	3	.926497	15	3	.930083	15	3	.933639	15	3	.937167	15
4	.922933	21	4	.926548	21	4	.930134	20	4	.933690	20	4	.937217	20
5	.922985	26	5	.926600	26	5	.930185	26	5	.933740	25	5	.937267	25
6	.923037	31	6	.926651	31	6	.930236	31	6	.933791	30	6	.937317	30
7	.923088	36	7	.926702	36	7	.930287	36	7	.933841	35	7	937367	35
8	.923140	42	8	.926754	41	8	.930338	41	8	.933892	40	8	.937418	40
9	.923192	47	9	.926805	46	9	.930389	46	9	.933943	45	9	.937468	45
8380	.923244	00	8450	.926857	00	8520	.930440	00	8590	.933993	00	8660	.937518	00
1	.923296	05	1	.926908	05	1	930491	05	1	.934044	05	1	.937568	05
2	.923348	10	2	.926959	10	2	.930541	10	2	.934094	10	2	.937618	10
3	.923399	16	3	.927011	15	3	.930592	15	3	.934145	15	3	.937668	15
4	.923451	21	4	.927062	21	4	.930643	20	4	.934195	20	4	.937718	20
5	.923503	26	5	.927114	26	5	.930694	25	5	.934246	25	5	.937769	25
6	.923555	31	6	.927165	31	6	.930745	31	6	934296	30	6	.937819	30
7	.923607	36	7	.927216	36	7	.930796	36	7	.934347	35	7	.937869	35
8	.923658	42	8	.927268	41	8	.930847	41	8	.934397	40	8	.937919	40
9	.923710	47	9	.927319	46	9	.930898	46	9	.934448	45	9	.937969	45
8390	.923762	00	8460	.927370	00	8530	.930949	00	8600	.934498	00	8670	.938019	00
1	.923814	05	1	.927422	05	1	.931000	05	1	.934549	05	1	938069	05
2	.923865	10	2	.927473	10	2	.931051	10	2	.934599	10	2	938119	10
3	.923917	16	3	.927524	15	3	.931102	15	3	.934650	15	3	.938169	15
4	.923969	21	4	.927576	21	4	.931153	20	4	.934700	20	4	.938219	20
5	.924021	26	5	.927627	26	5	.931203	25	5	.934751	25	5	.938269	25
6	.924072	31	6	.927678	31	6	.931254	31	6	.934801	30	6	.938319	30
7	.924124	36	7	.927730	36	7	.931305	36	7	.934852	35	7	.938370	35
8	.924176	42	8	.927781	41	8	.931356	41	8	.934902	40	8	.938420	40
9	.924228	47	9	.927832	46	9	.931407	46	9	.934953	45	9	.938470	45
8400	.924279	00	8470	.927883	00	8540	.931458	00	8610	.935003	00	8680	.938520	00
1	.924331	05	1	.927935	05	1	.931509	05	1	.935054	05	1	938570	05
2	.924383	10	2	.927986	10	2	.931560	10	2	.935104	10	2	938620	10
3	.924434	15	3	.928037	15	3	.931610	15	3	.935154	15	3	938670	15
4	.924486	21	4	.928088	21	4	.931661	20	4	.935205	20	4	.938720	20
5	.924538	26	5	.928140	26	5	.931712	25	5	.935255	25	5	.938770	25
6	.924589	31	6	.928191	31	6	.931763	31	6	.935306	30	6	.938820	30
7	.924641	36	7	.928242	36	7	.931814	36	7	.935356	35	7	.938870	35
8	.924693	41	8	.928293	41	8	.931864	41	8	.935406	40	8	938920	40
9	.924744	46	9	.928345	46	9	.931915	46	9	.935457	45	9	.938970	45
8410	.924796	00	8480	.928396	00	8550	.931966	00	8620	.935507	00	8690	.939020	00
1	.924848	05	1	.928447	05	1	.932017	05	1	.935558	05	1	.939070	05
2	.924899	10	2	.928498	10	2	.932068	10	2	.935608	10	2	.939120	10
3	.924951	15	3	928549	15	3	.932118	15	3	.935658	15	3	.939170	15
4	.925002	21	4	.928601	21	4	.932169	20	4	.935709	20	4	.939220	20
5	.925054	26	5	.928652	26	5	.932220	25	5	.935759	25	5	.939270	25
6	.925106	31	6	.928703	31	6	.932271	30	6	.935809	30	6	.939319	30
7	.925157	36	7	.928754	36	7	.932321	35	7	.935860	35	7	.939369	35
8	.925209	41	8	.928805	41	8	.932372	40	8	.935910	40	8	.939419	40
9	.925260	46	9	.928856	46	9	.932423	45	9	.935960	45	9	.939469	45

Log. .939519 to .956601 No. 8700 to 9049.

No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.
8700	.939519	00	8770	.943000	00	8840	.946452	00	8910	.949878	00	8980	.953276	00
1	.939569	05	1	.943049	05	1	.946501	05	1	949926	05	1	.953326	05
2	.939619	10	2	.943099	10	2	.946550	10	2	.949975	10	2	.953373	10
3	.939669	15	3	.943148	15	3	.946600	15	3	.950024	15	3	.953421	15
4	.939719	20	4	.943198	20	4	.946649	20	4	.950073	20	4	.953470	19
5	.939769	25	5	.943247	25	5	.946698	25	5	.950121	25	5	.953518	24
6	.939819	30	6	.943297	30	6	.946747	29	6	.950170	29	6	.953566	29
7	.939868	35	7	.943346	35	7	.946796	34	7	.950219	34	7	.953615	34
8	.939918	40	8	.943396	40	8	.946845	39	8	.950267	39	8	.953663	39
9	.939968	45	9	.943445	45	9	.946894	44	9	.950316	44	9	.953711	44
8710	.940018	00	8780	.943494	00	8850	.946943	00	8920	.950365	00	8990	.953760	00
1	.940068	05	1	.943544	05	1	.946992	05	1	.950413	05	1	.953808	05
2	.940118	10	2	.943593	10	2	.947041	10	2	.950462	10	2	.953856	10
3	.940168	15	3	.943643	15	3	.947090	15	3	.950511	15	3	.953905	15
4	.940218	20	4	.943692	20	4	.947139	20	4	.950560	19	4	.953953	19
5	.940267	25	5	.943742	25	5	.947189	25	5	.950608	24	5	.954001	24
6	.940317	30	6	.943791	30	6	.947238	29	6	.950657	29	6	.954049	29
7	.940367	35	7	.943841	35	7	.947287	34	7	.950705	34	7	.954098	34
8	.940417	40	8	.943890	40	8	.947336	39	8	.950754	39	8	.954146	39
9	.940467	45	9	.943939	45	9	.947385	44	9	.950803	44	9	.954194	44
8720	.940516	00	8790	.943989	00	8860	.947434	00	8930	.950851	00	9000	.954242	00
1	.940566	05	1	.944038	05	1	.947483	05	1	.950900	05	1	.954291	05
2	.940616	10	2	.944088	10	2	.947532	10	2	.950949	10	2	.954339	10
3	.940666	15	3	.944137	15	3	.947581	15	3	.950997	15	3	.954387	14
4	.940716	20	4	.944186	20	4	.947630	20	4	.951046	19	4	.954435	19
5	.940765	25	5	.944236	25	5	.947679	25	5	.951095	24	5	.954484	24
6	.940815	30	6	.944285	30	6	.947728	29	6	.951143	29	6	.954532	29
7	.940865	35	7	.944335	35	7	.947777	34	7	.951192	34	7	.954580	34
8	.940915	40	8	.944384	40	8	.947826	39	8	.951240	39	8	.954628	38
9	.940964	45	9	.944433	45	9	.947875	44	9	.951289	44	9	.954677	43
8730	.941014	00	8800	.944483	00	8870	.947924	00	8940	.951337	00	9010	.954725	00
1	.941064	05	1	.944532	05	1	.947973	05	1	.951386	05	1	.954773	05
2	.941114	10	2	.944581	10	2	.948021	10	2	.951435	10	2	.954821	10
3	.941163	15	3	.944631	15	3	.948070	15	3	.951483	15	3	.954869	14
4	.941213	20	4	.944680	20	4	.948119	20	4	.951532	19	4	.954918	19
5	.941263	25	5	.944729	25	5	.948168	25	5	.951580	24	5	.954966	24
6	.941313	30	6	.944779	30	6	.948217	29	6	.951629	29	6	.955014	29
7	.941362	35	7	.944828	35	7	.948266	34	7	.951677	34	7	.955062	34
8	.941412	40	8	.944877	40	8	.948315	39	8	.951726	39	8	.955110	38
9	.941462	45	9	.944927	45	9	.948364	44	9	.951774	44	9	.955158	43
8740	.941511	00	8810	.944976	00	8880	.948413	00	8950	.951823	00	9020	.955206	00
1	.941561	05	1	.945025	05	1	.948462	05	1	.951872	05	1	.955255	05
2	.941611	10	2	.945074	10	2	.948511	10	2	.951920	10	2	.955303	10
3	.941660	15	3	.945124	15	3	.948560	15	3	951969	15	3	.955351	14
4	.941710	20	4	.945173	20	4	.948608	20	4	.952017	19	4	.955399	19
5	.941760	25	5	.945222	25	5	.948657	25	5	.952066	24	5	.955447	24
6	.941809	30	6	.945272	30	6	.948706	29	6	.952114	29	6	.955495	29
7	.941859	35	7	.945321	35	7	.948755	34	7	.952163	34	7	.955543	34
8	.941909	40	8	.945370	40	8	.948804	39	8	.952211	39	8	.955592	38
9	.941958	45	9	.945419	45	9	.948853	44	9	.952259	44	9	.955640	43
8750	.942008	00	8820	.945469	00	8890	.948902	00	8960	.952308	00	9030	.955688	00
1	.942058	05	1	.945518	05	1	.948951	05	1	.952356	05	1	.955736	05
2	.942107	10	2	.945567	10	2	.948999	10	2	952405	10	2	.955784	10
3	.942157	15	3	.945616	15	3	.949048	15	3	.952453	15	3	.955832	14
4	.942206	20	4	.945665	20	4	.949097	20	4	.952502	19	4	.955880	19
5	.942256	25	5	.945715	25	5	.949146	25	5	.952550	24	5	.955928	24
6	.942306	30	6	.945764	29	6	.949195	29	6	.952599	29	6	.955976	29
7	.942355	35	7	.945813	34	7	.949244	34	7	.952647	34	7	.956024	34
8	.942405	40	8	.945862	39	8	.949292	39	8	.952696	39	8	.956072	38
9	.942454	45	9	.945911	44	9	.949341	44	9	.952744	44	9	.956120	43
8760	.942504	00	8830	.945961	00	8900	.949390	00	8970	.952792	00	9040	.956168	00
1	.942554	05	1	.946010	05	1	.949439	05	1	.952841	05	1	.956216	05
2	.942603	10	2	.946059	10	2	.949488	10	2	.952889	10	2	.956264	10
3	.942653	15	3	.946108	15	3	.949536	15	3	.952938	15	3	.956312	14
4	.942702	20	4	.946157	20	4	.949585	20	4	.952986	19	4	.956361	19
5	.942752	25	5	.946207	25	5	.949634	25	5	.953034	24	5	.956409	24
6	.942801	30	6	.946256	29	6	.949683	29	6	.953083	29	6	.956457	29
7	.942851	35	7	.946305	34	7	.949731	34	7	.953131	34	7	.956505	34
8	.942900	40	8	.946354	39	8	.949780	39	8	.953180	39	8	.956553	38
9	.942950	45	9	.946403	44	9	.949829	44	9	.953228	44	9	.956601	43

Log. .956649 to .973082 No. 9050 to 9399.

No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.
9050	.956649	00	9120	.959995	00	9190	.963315	00	9260	.966611	00	9330	.969882	00
1	.956697	05	1	.960042	05	1	.963363	05	1	.966658	05	1	.969928	05
2	.956744	10	2	.960090	10	2	.963410	09	2	.966705	09	2	.969975	09
3	.956792	14	3	.960138	14	3	.963457	14	3	.966752	14	3	.970021	14
4	.956840	19	4	.960185	19	4	.963504	19	4	.966798	19	4	.970068	19
5	.956888	24	5	.960233	24	5	.963552	24	5	.966845	24	5	.970114	23
6	.956936	29	6	.960280	28	6	.963599	28	6	.966892	28	6	.970161	28
7	.956984	34	7	.960328	33	7	.963646	33	7	.966939	33	7	.970207	33
8	.957032	38	8	.960376	38	8	.963693	38	8	.966986	38	8	.970254	37
9	.957080	43	9	.960423	43	9	.963741	42	9	.967033	42	9	.970300	42
9060	.957128	00	9130	.960471	00	9200	.963788	00	9270	.967080	00	9340	.970347	00
1	.957176	05	1	.960518	05	1	.963835	05	1	.967127	05	1	.970393	05
2	.957224	10	2	.960566	10	2	.963882	09	2	.967173	09	2	.970440	09
3	.957272	14	3	.960613	14	3	.963929	14	3	.967220	14	3	.970486	14
4	.957320	19	4	.960661	19	4	.963977	19	4	.967267	19	4	.970533	19
5	.957368	24	5	.960709	24	5	.964024	24	5	.967314	24	5	.970579	23
6	.957416	29	6	.960756	28	6	.964071	28	6	.967361	28	6	.970626	28
7	.957464	34	7	.960804	33	7	.964118	33	7	.967408	33	7	.970672	33
8	.957511	38	8	.960851	38	8	.964165	38	8	.967454	38	8	.970719	37
9	.957559	43	9	.960899	43	9	.964212	42	9	.967501	42	9	.970765	42
9070	.957607	00	9140	.960946	00	9210	.964260	00	9280	.967548	00	9350	.970812	00
1	.957655	05	1	.960994	05	1	.964307	05	1	.967595	05	1	.970858	05
2	.957703	10	2	.961041	10	2	.964354	09	2	.967642	09	2	.970904	09
3	.957751	14	3	.961089	14	3	.964401	14	3	.967688	14	3	.970951	14
4	.957799	19	4	.961136	19	4	.964448	19	4	.967735	19	4	.970997	19
5	.957847	24	5	.961184	24	5	.964495	24	5	.967782	23	5	.971044	23
6	.957894	29	6	.961231	28	6	.964542	28	6	.967829	28	6	.971090	28
7	.957942	34	7	.961279	33	7	.964590	33	7	.967875	38	7	.971137	33
8	.957990	38	8	.961326	38	8	.964637	38	8	.967922	38	8	.971183	37
9	.958038	43	9	.961374	43	9	.964684	42	9	.967969	42	9	.971229	42
9080	.958086	00	9150	.961421	00	9220	.964731	00	9290	.968016	00	9360	.971276	00
1	.958134	05	1	.961469	05	1	.964778	05	1	.968062	05	1	.971322	05
2	.958181	10	2	.961516	10	2	.964825	09	2	.968109	09	2	.971369	09
3	.958229	14	3	.961563	14	3	.964872	14	3	.968156	14	3	.971415	14
4	.958277	19	4	.961611	19	4	.964919	19	4	.968203	19	4	.971461	19
5	.958325	24	5	.961658	24	5	.964966	24	5	.968249	23	5	.971508	23
6	.958373	29	6	.961706	28	6	.965013	28	6	.968296	28	6	.971554	28
7	.958420	34	7	.961753	33	7	.965060	33	7	.968343	33	7	.971600	33
8	.958468	38	8	.961801	38	8	.965108	38	8	.968389	38	8	.971647	37
9	.958516	43	9	.961848	43	9	.965155	42	9	.968436	42	9	.971693	42
9090	.958564	00	9160	.961895	00	9230	.965202	00	9300	.968483	00	9370	.971740	00
1	.958612	05	1	.961943	05	1	.965249	05	1	.968530	05	1	.971786	05
2	.958659	10	2	.961990	10	2	.965296	09	2	.968576	09	2	.971832	09
3	.958707	14	3	.962038	14	3	.965343	14	3	.968623	14	3	.971879	14
4	.958755	19	4	.962085	19	4	.965390	19	4	.968670	19	4	.971925	19
5	.958803	24	5	.962132	24	5	.965437	24	5	.968716	23	5	.971971	23
6	.958850	29	6	.962180	28	6	.965484	28	6	.968763	28	6	.972018	28
7	.958898	34	7	.962227	33	7	.965531	33	7	.968810	33	7	.972064	33
8	.958946	38	8	.962275	38	8	.965578	38	8	.968856	37	8	.972110	37
9	.958994	43	9	.962322	43	9	.965625	42	9	.968903	42	9	.972156	42
9100	.959041	00	9170	.962369	00	9240	.965672	00	9310	.968950	00	9380	.972203	00
1	.959089	05	1	.962417	05	1	.965719	05	1	.968996	05	1	.972249	05
2	.959137	10	2	.962464	09	2	.965766	09	2	.969043	09	2	.972295	09
3	.959184	14	3	.962511	14	3	.965813	14	3	.969090	14	3	.972342	14
4	.959232	19	4	.962559	19	4	.965860	19	4	.969136	19	4	.972388	18
5	.959280	24	5	.962606	24	5	.965907	24	5	.969183	23	5	.972434	23
6	.959328	29	6	.962653	28	6	.965954	28	6	.969229	28	6	.972480	28
7	.959375	34	7	.962701	33	7	.966001	33	7	.969276	33	7	.972527	32
8	.959423	38	8	.962748	38	8	.966048	38	8	.969323	37	8	.972573	37
9	.959471	43	9	.962795	42	9	.966095	42	9	.969369	42	9	.972619	41
9110	.959518	00	9180	.962843	00	9250	.966142	00	9320	.969416	00	9390	.972666	00
1	.959566	05	1	.962890	05	1	.966189	05	1	.969462	05	1	.972712	05
2	.959614	10	2	.962937	09	2	.966236	09	2	.969509	09	2	.972758	09
3	.959661	14	3	.962985	14	3	.966283	14	3	.969556	14	3	.972804	14
4	.959709	19	4	.963032	19	4	.966329	19	4	.969602	19	4	.972851	18
5	.959757	24	5	.963079	24	5	.966376	24	5	.969649	23	5	.972897	23
6	.959804	29	6	.963126	28	6	.966423	28	6	.969695	28	6	.972943	28
7	.959852	34	7	.963174	33	7	.966470	33	7	.969742	33	7	.972989	32
8	.959900	38	8	.963221	38	8	.966517	38	8	.969788	37	8	.973035	37
9	.959947	43	9	.963268	42	9	.966564	42	9	.969835	42	9	.973082	41

Log. .973128 to .988960 No. 9400 to 9749.

No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.
9400	.973128	00	9470	.976350	00	9540	.979548	00	9610	.982723	00	9680	.985875	00
1	.973174	05	1	.976396	05	1	.979594	05	1	.982769	05	1	.985920	04
2	.973220	09	2	.976442	09	2	.979639	09	2	.982814	09	2	.985965	09
3	.973266	14	3	.976487	14	3	.979685	14	3	.982859	14	3	.986010	13
4	.973313	18	4	976533	18	4	.979730	18	4	.982904	18	4	.986055	18
5	.973358	23	5	.976579	23	5	.979776	23	5	.982949	23	5	.986100	22
6	973405	28	6	.976625	28	6	.979821	27	6	.982994	27	6	.986144	27
7	973451	32	7	.976671	32	7	.979867	32	7	.983040	32	7	.986189	31
8	.973497	37	8	.976717	37	8	.979912	36	8	.983085	36	8	.986234	36
9	973543	41	9	.976762	41	9	.979958	41	9	.983130	41	9	.986279	40
9410	.973590	00	9480	.976808	00	9550	.980003	00	9620	.983175	00	9690	.986324	00
1	.973636	05	1	.976854	05	1	.980049	05	1	.983220	05	1	.986369	04
2	.973682	09	2	.976900	09	2	.980094	09	2	.983265	09	2	.986413	09
3	.973728	14	3	.976946	14	3	.980140	14	3	.983310	14	3	.986458	13
4	.973774	18	4	.976991	18	4	.980185	18	4	.983356	18	4	.986503	18
5	.973820	23	5	.977037	23	5	.980231	23	5	.983401	23	5	.986548	22
6	.973866	28	6	.977083	27	6	.980276	27	6	.983446	27	6	.986593	27
7	.973913	32	7	.977129	32	7	.980322	32	7	.983491	32	7	.986637	31
8	.973959	37	8	977175	37	8	.980367	36	8	.983536	36	8	.986682	36
9	.974005	41	9	.977220	41	9	.980412	41	9	.983581	41	9	.986727	40
9420	.974051	00	9490	.977266	00	9560	.980458	00	9630	.983626	00	9700	986772	00
1	.974097	05	1	.977312	05	1	.980503	05	1	.983671	05	1	.986816	04
2	974143	09	2	.977358	09	2	.980549	09	2	983716	09	2	986861	09
3	.974189	14	3	.977403	14	3	.980594	14	3	.983762	14	3	.986906	13
4	.974235	18	4	.977449	18	4	.980640	18	4	.983807	18	4	.986951	18
5	.974281	23	5	.977495	23	5	.980685	23	5	983852	23	5	.986995	22
6	.974327	28	6	.977541	27	6	.980730	27	6	.983897	27	6	.987040	27
7	.974373	32	7	977586	32	7	.980776	32	7	.983942	32	7	.987085	31
8	.974420	37	8	.977632	37	8	.980821	36	8	.983987	36	8	.987130	36
9	.974466	41	9	.977678	41	9	.980867	41	9	.984032	41	9	.987174	40
9430	.974512	00	9500	.977724	00	9570	.980912	00	9640	.984077	00	9710	987219	00
1	.974558	05	1	.977769	05	1	.980957	05	1	.984122	05	1	.987264	04
2	.974604	09	2	.977815	09	2	981003	09	2	.984167	09	2	.987309	09
3	.974650	14	3	.977861	14	3	.981048	14	3	.984212	14	3	.987353	13
4	.974696	18	4	.977906	18	4	.981093	18	4	.984257	18	4	.987398	18
5	.974742	23	5	977952	23	5	.981139	23	5	.984302	23	5	.987443	22
6	.974788	28	6	.977998	27	6	.981184	27	6	.984347	27	6	987487	27
7	.974834	32	7	.978043	32	7	.981229	32	7	.984392	32	7	.987532	31
8	.974880	37	8	.978089	37	8	.981275	36	8	.984437	36	8	.987577	36
9	.974926	41	9	978135	41	9	.981320	41	9	.984482	41	9	.987622	40
9440	.974972	00	9510	.978180	00	9580	.981365	00	9650	.984527	00	9720	.987666	00
1	.975018	05	1	.978226	05	1	.981411	05	1	.984572	05	1	.987711	04
2	.975064	09	2	.978272	09	2	.981456	09	2	.984617	09	2	.987756	09
3	.975110	14	3	.978317	14	3	.981501	14	3	.984662	14	3	.987800	13
4	.975156	18	4	.978363	18	4	.981547	18	4	.984707	18	4	.987845	18
5	.975202	23	5	.978409	23	5	981592	23	5	.984752	23	5	.987890	22
6	.975248	28	6	.978454	27	6	.981637	27	6	984797	27	6	.987934	27
7	.975294	32	7	.978500	32	7	.981683	32	7	.984842	32	7	.987979	31
8	.975340	37	8	.978546	37	8	.981728	36	8	.984887	36	8	.988024	36
9	.975386	41	9	.978591	41	9	.981773	41	9	984932	41	9	.988068	40
9450	.975432	00	9520	.978637	00	9590	.981819	00	9660	.984977	00	9730	.988113	00
1	.975478	05	1	.978683	05	1	.981864	05	1	.985022	05	1	.988157	04
2	.975524	09	2	.978728	09	2	.981909	09	2	.985067	09	2	.988202	09
3	.975570	14	3	.978774	14	3	981954	14	3	.985112	14	3	.988247	13
4	.975616	18	4	.978819	18	4	.982000	18	4	.985157	18	4	.988291	18
5	.975661	23	5	.978865	23	5	.982045	23	5	.985202	23	5	.988336	22
6	975707	28	6	.978911	27	6	.982090	27	6	.985247	27	6	.988381	27
7	.975753	32	7	.978956	32	7	.982135	32	7	.985292	32	7	.988425	31
8	.975799	37	8	.979002	36	8	.982181	36	8	.985337	36	8	.988470	36
9	.975845	41	9	.979047	41	9	.982226	41	9	985382	41	9	.988514	40
9460	.975891	00	9530	.979093	00	9600	.982271	00	9670	.985426	00	9740	.988559	00
1	.975937	05	1	.979138	05	1	.982316	05	1	.985471	04	1	.988603	04
2	.975983	09	2	.979184	09	2	.982362	09	2	.985516	09	2	.988648	09
3	.976029	14	3	.979230	14	3	.982407	14	3	.985561	13	3	.988693	13
4	.976075	18	4	.979275	18	4	.982452	18	4	.985606	18	4	.988737	18
5	.976121	23	5	.979321	23	5	.982497	23	5	.985651	22	5	.988782	22
6	.976166	28	6	.979366	27	6	.982543	27	6	.985696	27	6	.988826	27
7	.976212	32	7	.979412	32	7	.982588	32	7	.985741	31	7	.988871	31
8	.976258	37	8	.979457	36	8	.982633	36	8	.985786	36	8	.988915	36
9	.976304	41	9	.979503	41	9	.982678	41	9	.985830	40	9	.988960	40

Log. .989005 to .999957 No. 9750 to 9999.

No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.	No.	Log.	Part.
9750	.989005	00	9800	.991226	00	9850	.993436	00	9900	.995635	00	9950	.997823	00
1	.989049	04	1	.991270	04	1	.993480	04	1	.995679	04	1	.997867	04
2	.989094	09	2	.991315	09	2	.993524	09	2	.995723	09	2	.997910	09
3	.989138	13	3	.991359	13	3	.993568	13	3	.995767	13	3	.997954	13
4	.989183	18	4	.991403	18	4	.993613	18	4	.995811	18	4	.997998	17
5	.989227	22	5	.991448	22	5	.993657	22	5	.995854	22	5	.998041	22
6	.989272	27	6	.991492	27	6	.993701	26	6	.995898	26	6	.998085	26
7	.989316	31	7	.991536	31	7	.993745	31	7	.995942	31	7	.998128	30
8	.989361	36	8	.991580	36	8	.993789	35	8	.995986	35	8	.998172	35
9	.989405	40	9	.991625	40	9	.993833	40	9	.996030	40	9	.998216	39
9760	.989450	00	9810	.991669	00	9860	.993877	00	9910	.996074	00	9960	.998259	00
1	.989494	04	1	.991713	04	1	.993921	04	1	.996117	04	1	.998303	04
2	.989539	09	2	.991757	09	2	.993965	09	2	.996161	09	2	.998346	09
3	.989583	13	3	.991802	13	3	.994009	13	3	.996205	13	3	.998390	13
4	.989628	18	4	.991846	18	4	.994053	18	4	.996249	18	4	.998434	17
5	.989672	22	5	.991890	22	5	.994097	22	5	.996293	22	5	.998477	22
6	.989717	27	6	991934	27	6	.994141	26	6	.996336	26	6	.998521	26
7	.989761	31	7	.991979	31	7	.994185	31	7	.996380	31	7	.998564	30
8	.989806	36	8	.992023	36	8	.994229	35	8	.996424	35	8	.998608	35
9	.989850	40	9	.992067	40	9	.994273	40	9	.996468	40	9	.998652	39
9770	.989895	00	9820	.992111	00	9870	.994317	00	9920	.996512	00	9970	.998695	00
1	.989939	04	1	.992156	04	1	.994361	04	1	.996555	04	1	.998739	04
2	.989983	09	2	.992200	09	2	.994405	09	2	.996599	09	2	.998782	09
3	.990028	13	3	.992244	13	3	.994449	13	3	.996643	13	3	.998826	13
4	.990072	18	4	.992288	18	4	.994493	18	4	.996687	18	4	.998869	17
5	.990117	22	5	.992333	22	5	.994537	22	5	.996730	22	5	.998913	22
6	.990161	27	6	.992377	26	6	.994581	26	6	.996774	26	6	.998956	26
7	.990206	31	7	.992421	31	7	.994625	31	7	.996818	31	7	.999000	30
8	.990250	36	8	.992465	35	8	.994669	35	8	.996862	35	8	.999043	35
9	.990294	40	9	.992509	40	9	.994713	40	9	.996905	40	9	.999087	39
9780	.990339	00	9830	.992553	00	9880	.994757	00	9930	.996949	00	9980	.999130	00
1	.990383	04	1	.992598	04	1	.994801	04	1	.996993	04	1	.999174	04
2	.990428	09	2	.992642	09	2	.994845	09	2	.997037	09	2	.999218	09
3	.990472	13	3	.992686	13	3	.994889	13	3	.997080	13	3	.999261	13
4	.990516	18	4	.992730	18	4	.994933	18	4	.997124	18	4	.999305	17
5	.990561	22	5	.992774	22	5	.994977	22	5	.997168	22	5	.999348	22
6	.990605	27	6	.992818	26	6	.995021	26	6	.997212	26	6	.999392	26
7	.990650	31	7	.992863	31	7	.995064	31	7	.997255	31	7	.999435	30
8	.990694	36	8	.992907	35	8	.995108	35	8	.997299	35	8	.999478	35
9	.990738	40	9	.992951	40	9	.995152	40	9	.997343	39	9	.999522	39
9790	.990783	00	9840	.992995	00	9890	.995196	00	9940	.997386	00	9990	.999565	00
1	.990827	04	1	.993039	04	1	.995240	04	1	.997430	04	1	.999609	04
2	.990871	09	2	.993083	09	2	.995284	09	2	.997474	09	2	.999652	09
3	.990916	13	3	.993127	13	3	.995328	13	3	.997517	13	3	.999696	13
4	.990960	18	4	.993172	18	4	.995372	18	4	.997561	17	4	.999739	17
5	.991004	22	5	.993216	22	5	.995416	22	5	.997605	22	5	.999783	22
6	.991049	27	6	.993260	26	6	.995460	26	6	.997648	26	6	.999826	26
7	.991093	31	7	.993304	31	7	.995504	31	7	.997692	30	7	.999870	30
8	.991137	36	8	.993348	35	8	.995547	35	8	.997736	35	8	.999913	35
9	.991182	40	9	.993392	40	9	.995591	40	9	.997779	39	9	.999957	39

Natural Versines to Seconds of Time.

sec.	0m	1m	2m	3m	4m	5m	6m	7m	8m	9m	10m	11m	sec.
0	0	10	39	86	152	238	343	466	609	771	952	1152	0
1	0	10	39	87	153	240	345	469	612	774	955	1155	1
2	0	10	39	88	155	241	346	471	614	777	958	1159	2
3	0	10	40	89	156	243	348	473	617	780	961	1162	3
4	0	11	41	90	157	244	350	475	619	782	964	1166	4
5	0	11	41	91	159	246	352	478	622	785	968	1169	5
6	0	12	42	92	160	248	354	480	624	788	971	1173	6
7	0	12	43	93	161	249	356	482	627	791	974	1176	7
8	0	12	43	93	163	251	358	484	630	794	977	1180	8
9	0	13	44	94	164	253	360	487	632	797	981	1183	9
10	0	13	45	95	165	254	362	489	635	800	984	1187	10
11	0	13	45	96	167	256	364	491	637	803	987	1190	11
12	0	14	46	97	168	257	366	493	640	806	990	1194	12
13	0	14	47	98	169	259	368	496	643	809	993	1197	13
14	1	14	47	99	171	261	370	498	645	811	997	1201	14
15	1	15	48	100	172	262	372	500	648	814	1000	1205	15
16	1	15	49	102	173	264	374	503	650	817	1003	1208	16
17	1	16	50	103	175	266	376	505	653	820	1006	1212	17
18	1	16	50	104	176	267	378	507	656	823	1010	1215	18
19	1	17	51	105	177	269	380	510	658	826	1013	1219	19
20	1	17	52	106	179	271	382	512	661	829	1016	1222	20
21	1	17	53	107	180	272	384	514	664	832	1020	1226	21
22	1	18	53	108	182	274	386	517	666	835	1023	1230	22
23	1	18	54	109	183	276	388	519	669	838	1026	1233	23
24	2	19	55	110	184	278	390	521	672	841	1029	1237	24
25	2	19	56	111	185	279	392	524	674	844	1033	1241	25
26	2	20	56	112	187	281	394	526	677	847	1036	1244	26
27	2	20	57	113	188	283	396	528	680	850	1039	1248	27
28	2	20	58	114	190	284	398	531	682	853	1043	1251	28
29	2	21	59	116	191	286	400	533	685	856	1046	1255	29
30	3	21	59	117	193	288	402	535	688	859	1049	1259	30
31	3	22	60	118	194	289	404	538	690	862	1053	1262	31
32	3	22	61	119	196	291	406	540	693	865	1056	1266	32
33	3	23	62	120	197	293	408	543	696	868	1059	1270	33
34	3	23	63	121	198	295	410	545	699	871	1062	1273	34
35	3	24	64	122	200	297	412	547	701	874	1066	1277	35
36	3	24	64	123	201	299	415	550	704	877	1069	1281	36
37	4	25	65	124	203	300	417	552	707	880	1073	1284	37
38	4	25	66	126	204	302	419	555	709	883	1076	1288	38
39	4	26	67	127	206	304	421	557	712	886	1079	1292	39
40	4	26	68	128	207	306	423	559	715	889	1083	1295	40
41	4	27	68	129	209	307	425	562	718	892	1086	1299	41
42	5	28	69	130	210	309	427	564	720	896	1090	1303	42
43	5	28	70	131	212	311	429	567	723	899	1093	1307	43
44	5	29	71	133	213	313	432	569	726	902	1096	1310	44
45	5	29	72	134	215	315	434	572	729	905	1100	1314	45
46	6	30	73	135	216	316	436	574	732	908	1103	1318	46
47	6	30	74	136	218	318	438	577	734	911	1107	1321	47
48	6	31	75	137	219	320	440	579	737	914	1110	1325	48
49	6	31	75	139	221	322	442	582	740	917	1114	1329	49
50	7	32	76	140	222	324	444	584	743	920	1117	1333	50
51	7	33	77	141	225	326	447	587	745	923	1120	1336	51
52	7	33	78	142	226	328	449	589	748	927	1124	1340	52
53	7	34	79	144	227	329	451	592	751	930	1127	1344	53
54	8	34	80	145	229	331	453	594	754	933	1131	1348	54
55	8	35	81	146	230	333	455	597	757	936	1134	1352	55
56	8	36	82	147	232	335	458	599	760	939	1138	1355	56
57	8	36	83	149	233	337	460	602	763	942	1141	1359	57
58	8	37	84	150	235	339	462	604	765	945	1145	1363	58
59	9	37	85	151	236	341	464	607	768	949	1148	1367	59
60	10	38	86	152	238	343	466	609	771	952	1152	1370	60

Natural Versines to Seconds of Time.

sec.	12m	13m	14m	15m	16m	17m	18m	19m	20m	21m	22m	23m	sec.
0	1370	1608	1865	2141	2436	2750	3083	3434	3805	4195	4604	5031	0
1	1374	1612	1870	2146	2441	2755	3088	3441	3812	4202	4611	5039	1
2	1378	1617	1874	2151	2446	2761	3093	3447	3818	4208	4618	5046	2
3	1382	1621	1879	2155	2451	2766	3099	3453	3824	4215	4625	5053	3
4	1386	1625	1883	2160	2456	2771	3106	3459	3831	4222	4632	5061	4
5	1390	1629	1887	2165	2461	2777	3111	3465	3837	4228	4639	5068	5
6	1393	1633	1892	2170	2466	2782	3117	3471	3843	4235	4646	5075	6
7	1397	1637	1896	2175	2472	2788	3123	3477	3850	4242	4653	5083	7
8	1401	1641	1901	2179	2477	2793	3128	3483	3856	4248	4660	5090	8
9	1405	1646	1905	2184	2482	2799	3134	3489	3863	4255	4667	5097	9
10	1409	1650	1910	2189	2487	2804	3140	3495	3869	4262	4674	5105	10
11	1413	1654	1914	2194	2492	2809	3146	3501	3875	4269	4681	5112	11
12	1416	1658	1919	2198	2497	2815	3151	3507	3882	4275	4688	5119	12
13	1420	1662	1923	2203	2502	2820	3157	3513	3888	4282	4695	5127	13
14	1424	1667	1928	2208	2507	2826	3163	3519	3895	4289	4702	5134	14
15	1428	1671	1932	2213	2513	2831	3169	3525	3901	4295	4709	5141	15
16	1432	1675	1937	2218	2518	2837	3175	3531	3907	4302	4716	5149	16
17	1436	1679	1941	2223	2523	2842	3180	3538	3914	4309	4723	5156	17
18	1440	1683	1946	2227	2528	2848	3186	3544	3920	4316	4730	5163	18
19	1444	1688	1950	2232	2533	2853	3192	3550	3927	4322	4737	5171	19
20	1448	1692	1955	2237	2538	2859	3198	3556	3933	4329	4744	5178	20
21	1451	1696	1960	2242	2544	2864	3204	3562	3940	4336	4751	5186	21
22	1455	1700	1964	2247	2549	2870	3209	3568	3946	4343	4758	5193	22
23	1459	1705	1968	2252	2554	2875	3215	3574	3952	4350	4766	5200	23
24	1463	1709	1973	2257	2559	2881	3221	3581	3959	4356	4773	5208	24
25	1467	1713	1978	2262	2564	2886	3227	3587	3965	4363	4780	5215	25
26	1471	1717	1982	2266	2570	2892	3233	3593	3972	4370	4787	5223	26
27	1475	1722	1987	2272	2575	2897	3239	3599	3978	4377	4794	5230	27
28	1479	1726	1992	2276	2580	2903	3244	3605	3985	4383	4801	5237	28
29	1483	1730	1997	2281	2585	2908	3250	3611	3991	4390	4808	5245	29
30	1487	1734	2001	2286	2590	2914	3256	3618	3998	4397	4815	5252	30
31	1491	1739	2005	2291	2596	2919	3262	3624	4004	4404	4822	5260	31
32	1495	1743	2010	2296	2601	2925	3268	3630	4011	4411	4829	5267	32
33	1499	1747	2014	2301	2606	2930	3274	3636	4017	4418	4837	5275	33
34	1503	1751	2019	2306	2611	2936	3280	3642	4024	4424	4844	5282	34
35	1507	1756	2024	2311	2617	2942	3286	3648	4030	4431	4851	5290	35
36	1511	1760	2028	2316	2622	2947	3291	3655	4037	4438	4858	5297	36
37	1515	1764	2033	2321	2627	2952	3297	3661	4043	4445	4865	5305	37
38	1519	1769	2038	2326	2632	2958	3303	3667	4050	4452	4872	5312	38
39	1523	1773	2042	2331	2638	2964	3309	3673	4056	4459	4880	5320	39
40	1527	1777	2047	2335	2643	2970	3315	3680	4063	4465	4887	5327	40
41	1531	1782	2052	2340	2648	2975	3321	3686	4070	4472	4894	5335	41
42	1535	1786	2056	2345	2654	2981	3327	3692	4076	4479	4901	5342	42
43	1539	1790	2061	2350	2659	2986	3333	3698	4083	4486	4908	5350	43
44	1543	1795	2066	2355	2664	2992	3339	3705	4089	4493	4916	5357	44
45	1547	1799	2070	2360	2669	2998	3345	3711	4096	4500	4923	5365	45
46	1551	1804	2075	2365	2675	3003	3351	3717	4102	4507	4930	5372	46
47	1555	1808	2080	2370	2680	3009	3357	3723	4109	4514	4937	5380	47
48	1559	1812	2084	2375	2685	3015	3363	3730	4116	4520	4944	5387	48
49	1563	1817	2089	2380	2691	3020	3369	3736	4122	4527	4952	5395	49
50	1567	1821	2094	2385	2696	3026	3375	3742	4129	4534	4959	5402	50
51	1571	1825	2099	2390	2701	3031	3380	3749	4135	4541	4966	5410	51
52	1575	1830	2103	2395	2707	3037	3386	3755	4142	4548	4973	5417	52
53	1580	1834	2108	2401	2712	3043	3392	3761	4149	4555	4981	5425	53
54	1584	1839	2113	2406	2718	3049	3398	3767	4155	4562	4988	5433	54
55	1588	1843	2117	2411	2723	3054	3404	3774	4162	4569	4995	5440	55
56	1592	1847	2122	2416	2728	3060	3410	3780	4168	4576	5002	5448	56
57	1596	1852	2127	2421	2734	3066	3416	3786	4175	4583	5010	5455	57
58	1600	1856	2132	2426	2739	3071	3422	3793	4182	4590	5017	5463	58
59	1604	1861	2136	2431	2744	3077	3428	3799	4188	4597	5024	5470	59
60	1608	1865	2141	2436	2750	3083	3434	3805	4195	4604	5031	5478	60

Natural Versines to Seconds of Time.

sec.	24m	25m	26m	27m	28m	29m	30m	31m	32m	33m	34m	35m	sec.
0	5478	5944	6428	6931	7454	7995	8555	9134	9732	10349	10984	11638	0
1	5486	5952	6436	6940	7463	8004	8564	9144	9742	10359	10995	11649	1
2	5494	5960	6445	6949	7472	8013	8574	9154	9752	10369	11006	11661	2
3	5501	5967	6453	6957	7481	8023	8583	9164	9762	10379	11016	11672	3
4	5509	5975	6461	6966	7489	8032	8593	9173	9772	10390	11027	11683	4
5	5516	5983	6469	6974	7498	8041	8602	9183	9782	10400	11038	11694	5
6	5524	5991	6478	6983	7507	8050	8612	9193	9793	10411	11049	11705	6
7	5531	5999	6486	6991	7516	8059	8621	9203	9803	10421	11059	11716	7
8	5539	6007	6494	7000	7525	8069	8631	9213	9813	10432	11070	11727	8
9	5547	6015	6502	7009	7534	8078	8641	9223	9823	10442	11081	11738	9
10	5554	6023	6511	7017	7543	8087	8650	9232	9833	10453	11092	11749	10
11	5562	6031	6519	7026	7552	8096	8659	9242	9843	10463	11102	11760	11
12	5570	6039	6527	7034	7561	8106	8669	9252	9854	10474	11114	11772	12
13	5577	6047	6536	7043	7570	8115	8679	9262	9864	10484	11124	11783	13
14	5585	6055	6544	7052	7579	8124	8689	9272	9874	10495	11135	11794	14
15	5593	6063	6551	7060	7587	8133	8698	9282	9884	10495	11146	11805	15
16	5600	6071	6560	7069	7596	8143	8708	9292	9895	10516	11157	11816	16
17	5608	6079	6569	7078	7605	8152	8717	9301	9905	10526	11167	11827	17
18	5616	6087	6577	7086	7614	8161	8727	9311	9915	10537	11178	11838	18
19	5623	6095	6585	7095	7623	8170	8736	9321	9925	10547	11189	11849	19
20	5631	6103	6594	7103	7632	8180	8746	9331	9935	10558	11200	11861	20
21	5639	6111	6602	7112	7641	8189	8755	9341	9945	10568	11211	11872	21
22	5647	6119	6610	7121	7650	8198	8765	9351	9956	10579	11222	11883	22
23	5654	6127	6619	7130	7659	8207	8774	9361	9966	10590	11233	11894	23
24	5662	6135	6627	7138	7668	8217	8784	9371	9976	10601	11244	11906	24
25	5670	6143	6636	7147	7677	8226	8794	9381	9986	10611	11254	11917	25
26	5678	6151	6644	7156	7686	8235	8804	9391	9997	10622	11265	11928	26
27	5685	6159	6652	7164	7695	8245	8813	9401	10007	10632	11276	11939	27
28	5693	6167	6661	7173	7704	8254	8823	9411	10017	10643	11287	11950	28
29	5701	6175	6669	7182	7713	8263	8832	9421	10027	10653	11298	11961	29
30	5709	6183	6678	7190	7722	8273	8842	9431	10038	10664	11309	11973	30
31	5716	6192	6686	7199	7731	8282	8852	9441	10048	10674	11320	11984	31
32	5724	6200	6694	7208	7740	8291	8862	9451	10058	10685	11331	11995	32
33	5732	6208	6703	7217	7749	8301	8872	9461	10068	10695	11342	12006	33
34	5740	6216	6711	7226	7758	8310	8881	9471	10079	10706	11353	12018	34
35	5747	6224	6719	7234	7767	8319	8891	9481	10089	10716	11364	12029	35
36	5755	6232	6728	7243	7776	8329	8900	9491	10100	10728	11374	12040	36
37	5763	6240	6736	7251	7785	8338	8910	9501	10110	10738	11385	12051	37
38	5771	6248	6745	7260	7794	8348	8920	9511	10120	10749	11396	12063	38
39	5779	6256	6753	7269	7804	8357	8930	9521	10130	10759	11407	12074	39
40	5786	6264	6762	7278	7813	8366	8939	9531	10141	10770	11418	12085	40
41	5794	6273	6770	7286	7822	8376	8949	9541	10151	10781	11429	12096	41
42	5802	6281	6778	7295	7831	8385	8958	9551	10162	10792	11440	12108	42
43	5810	6289	6787	7304	7840	8394	8968	9561	10172	10802	11452	12119	43
44	5818	6297	6795	7313	7849	8404	8978	9571	10182	10813	11462	12130	44
45	5826	6305	6804	7321	7858	8413	8988	9581	10192	10823	11473	12141	45
46	5833	6313	6812	7330	7867	8423	8997	9591	10203	10834	11484	12153	46
47	5841	6322	6821	7339	7876	8432	9007	9601	10213	10844	11495	12164	47
48	5849	6330	6829	7348	7885	8442	9017	9611	10224	10855	11506	12176	48
49	5857	6338	6838	7357	7894	8451	9027	9621	10234	10865	11517	12187	49
50	5865	6346	6846	7365	7903	8460	9036	9631	10245	10877	11528	12198	50
51	5873	6354	6855	7374	7913	8470	9046	9641	10255	10887	11539	12209	51
52	5881	6362	6863	7383	7922	8479	9056	9651	10265	10898	11550	12221	52
53	5888	6371	6872	7392	7931	8489	9066	9661	10275	10909	11561	12232	53
54	5896	6379	6880	7401	7940	8498	9075	9671	10286	10920	11572	12243	54
55	5904	6387	6889	7410	7949	8508	9085	9681	10296	10930	11583	12254	55
56	5912	6395	6897	7418	7958	8517	9095	9691	10307	10941	11594	12266	56
57	5920	6403	6906	7427	7968	8527	9105	9701	10317	10952	11605	12277	57
58	5928	6411	6914	7436	7977	8536	9114	9712	10328	10963	11616	12289	58
59	5936	6420	6923	7445	7986	8546	9124	9722	10338	10973	11627	12300	59
60	5944	6428	6931	7454	7995	8555	9134	9732	10349	10984	11638	12312	60

Natural Versines.

′	0°	1°	2°	3°	4°	5°	6°	7°	8°	9°	′
0	0000000	0000152	0000609	0001370	0002436	0003805	0005478	0007454	0009732	0012312	0
1	0000000	0000157	0000619	0001386	0002456	0003831	0005509	0007489	0009772	0012357	1
2	00000	00163	00630	01401	02477	03856	05539	07525	09813	12403	2
3	00000	00168	00640	01416	02497	03882	05570	07561	09854	12449	3
4	0000001	0000173	0000650	0001432	0002518	0003907	0005600	0007596	0009894	0012494	4
5	00001	00179	00661	01448	02538	03933	05631	07632	09935	12540	5
6	00001	00184	00672	01463	02559	03959	05662	07668	09976	12586	6
7	0000002	0000190	0000682	0001479	0002580	0003985	0005693	0007704	0010017	0012632	7
8	00003	00196	00693	01495	02601	04011	05724	07740	10058	12678	8
9	00003	00201	00704	01511	02622	04037	05755	07776	10100	12725	9
10	0000004	0000207	0000715	0001527	0002643	0004063	0005786	0007813	0010141	0012771	10
11	00005	00213	00726	01543	02664	04089	05818	07849	10182	12817	11
12	00006	00219	00737	01559	02685	04116	05849	07885	10224	12864	12
13	0000007	0000226	0000748	0001575	0002707	0004142	0005880	0007922	0010265	0012910	13
14	00008	00232	00760	01592	02728	04168	05912	07958	10307	12957	14
15	00009	00238	00771	01608	02750	04195	05944	07995	10349	13004	15
16	0000011	0000244	0000782	0001625	0002771	0004222	0005975	0008032	0010390	0013050	16
17	00012	00251	00794	01641	02793	04248	06007	08069	10432	13097	17
18	00014	00257	00806	01658	02815	04275	06039	08106	10474	13144	18
19	0000015	0000264	0000817	0001675	0002837	0004302	0006071	0008143	0010516	0013191	19
20	00017	00271	00829	01692	02859	04329	06103	08180	10558	13238	20
21	00019	00278	00841	01709	02881	04356	06135	08217	10601	13286	21
22	0000020	0000284	0000853	0001726	0002903	0004383	0006167	0008254	0010643	0013333	22
23	00022	00291	00865	01743	02925	04411	06200	08291	10685	13380	23
24	00024	00299	00877	01760	02947	04438	06232	08329	10728	13428	24
25	0000026	0000306	0000889	0001777	0002970	0004465	0006264	0008366	0010770	0013475	25
26	00029	00313	00902	01795	02992	04493	06297	08404	10813	13523	26
27	00031	00320	00914	01812	03015	04520	06330	08442	10855	13571	27
28	0000033	0000328	0000927	0001830	0003037	0004548	0006362	0008479	0010898	0013618	28
29	00036	00335	00939	01847	03060	04576	06395	08517	10941	13666	29
30	00038	00343	00952	01865	03083	04604	06428	08555	10984	13714	30
31	0000041	0000350	0000964	0001883	0003105	0004632	0006461	0008593	0011027	0013762	31
32	00043	00358	00977	01901	03128	04660	06494	08631	11070	13811	32
33	00046	00366	00990	01919	03151	04688	06527	08669	11113	13859	33
34	0000049	0000374	0001003	0001937	0003175	0004716	0006560	0008708	0011157	0013907	34
35	00052	00382	01016	01955	03198	04744	06594	08746	11200	13955	35
36	00055	00390	01029	01973	03221	04773	06627	08784	11244	14004	36
37	0000058	0000398	0001043	0001992	0003244	0004801	0006661	0008823	0011287	0014052	37
38	00061	00406	01056	02010	03268	04829	06694	08862	11331	14101	38
39	00064	00415	01069	02028	03291	04858	06728	08900	11374	14150	39
40	0000068	0000423	0001083	0002047	0003315	0004887	0006762	0008939	0011418	0014199	40
41	00071	00432	01096	02066	03339	04916	06795	08978	11462	14248	41
42	00075	00440	01110	02084	03363	04944	06829	09017	11506	14296	42
43	0000078	0000449	0001124	0002103	0003386	0004973	0006863	0009056	0011550	0014346	43
44	00082	00458	01138	02122	03410	05002	06897	09095	11594	14395	44
45	00086	00466	01152	02141	03434	05031	06931	09134	11638	14444	45
46	0000089	0000475	0001166	0002160	0003459	0005061	0006966	0009173	0011683	0014493	46
47	00093	00484	01180	02179	03483	05090	07000	09213	11727	14543	47
48	00097	00493	01194	02198	03507	05119	07034	09252	11772	14592	48
49	0000102	0000503	0001208	0002218	0003531	0005149	0007069	0009292	0011816	0014642	49
50	00106	00512	01222	02237	03556	05178	07103	09331	11861	14691	50
51	00110	00521	01237	02257	03580	05208	07138	09371	11905	14741	51
52	0000114	0000531	0001251	0002276	0003605	0005237	0007173	0009411	0011950	0014791	52
53	00119	00540	01266	02296	03630	05267	07208	09451	11995	14841	53
54	00123	00550	01281	02316	03655	05297	07243	09490	12040	14891	54
55	0000128	0000559	0001295	0002335	0003680	0005327	0007278	0009531	0012085	0014941	55
56	00133	00569	01310	02355	03705	05357	07313	09571	12130	14991	56
57	00137	00579	01325	02375	03730	05387	07348	09611	12175	15041	57
58	0000142	0000589	0001340	0002395	0003755	0005417	0007383	0009651	0012221	0015091	58
59	00147	00599	01355	02416	03780	05448	07418	09691	12266	15142	59
60	00152	00609	01370	02436	03805	05478	07454	09732	12312	15192	60

Parts for Seconds.

	0°		1°		2°		3°		4°		5°		6°		7°		8°		9°		10°	
"	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	"
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
2	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2
3	0	0	0	0	0	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	3	3
4	0	0	0	0	1	1	1	1	1	1	2	2	2	2	2	2	3	3	3	3	3	4
5	0	0	0	1	1	1	1	1	2	2	2	2	2	3	3	3	3	4	4	4	4	5
6	0	0	0	1	1	1	1	2	2	2	2	3	3	3	3	4	4	4	4	5	5	6
7	0	0	1	1	1	1	2	2	2	3	3	3	3	4	4	4	5	5	5	6	6	7
8	0	0	1	1	1	2	2	2	3	3	3	4	4	4	5	5	5	6	6	7	7	8
9	0	0	1	1	1	2	2	3	3	3	4	4	4	5	5	6	6	6	7	7	8	9
10	0	0	1	1	2	2	2	3	3	4	4	5	5	5	6	6	7	7	8	8	8	10
11	0	0	1	1	2	2	3	3	4	4	5	5	6	6	6	7	7	8	8	9	9	11
12	0	0	1	1	2	2	3	3	4	5	5	6	6	7	7	8	8	9	9	10	10	12
13	0	0	1	2	2	3	3	4	4	5	5	6	7	7	8	8	9	9	10	10	11	13
14	0	0	1	2	2	3	3	4	5	5	6	6	7	8	8	9	9	10	11	11	12	14
15	0	1	1	2	2	3	4	4	5	6	6	7	8	8	9	9	10	11	11	12	13	15
16	0	1	1	2	3	3	4	5	5	6	7	7	8	9	9	10	11	11	12	13	13	16
17	0	1	1	2	3	4	4	5	6	6	7	8	9	9	10	11	11	12	13	14	14	17
18	0	1	1	2	3	4	5	5	6	7	8	8	9	10	11	11	12	13	14	14	15	18
19	0	1	2	2	3	4	5	6	6	7	8	9	10	10	11	12	13	14	14	15	16	19
20	0	1	2	2	3	4	5	6	7	8	8	9	10	11	12	13	13	14	15	16	17	20
21	0	1	2	3	3	4	5	6	7	8	9	10	11	11	12	13	14	15	16	17	18	21
22	0	1	2	3	4	5	6	6	7	8	9	10	11	12	13	14	15	16	17	18	19	22
23	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	14	15	16	17	18	19	23
24	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	24
25	0	1	2	3	4	5	6	7	8	9	11	12	13	14	15	16	17	18	19	20	21	25
26	0	1	2	3	4	5	7	8	9	10	11	12	13	14	15	16	17	19	20	21	22	26
27	0	1	2	3	5	6	7	8	9	10	11	12	14	15	16	17	18	19	20	22	23	27
28	0	1	2	3	5	6	7	8	9	11	12	13	14	15	16	18	19	20	21	22	24	28
29	0	1	2	4	5	6	7	9	10	11	12	13	15	16	17	18	19	21	22	23	24	29
30	0	1	2	4	5	6	8	9	10	11	13	14	15	16	18	19	20	21	23	24	25	30
31	0	1	3	4	5	7	8	9	10	12	13	14	16	17	18	20	21	22	23	25	26	31
32	0	1	3	4	5	7	8	9	11	12	13	15	16	17	19	20	22	23	24	26	27	32
33	0	1	3	4	6	7	8	10	11	12	14	15	17	18	19	21	22	24	25	26	28	33
34	0	1	3	4	6	7	9	10	11	13	14	16	17	19	20	21	23	24	26	27	29	34
35	0	1	3	4	6	7	9	10	12	13	15	16	18	19	21	22	24	25	26	28	29	35
36	0	1	3	5	6	8	9	11	12	14	15	17	18	20	21	23	24	26	27	29	30	36
37	0	1	3	5	6	8	9	11	12	14	16	17	19	20	22	23	25	26	28	30	31	37
38	0	2	3	5	6	8	10	11	13	14	16	18	19	21	22	24	26	27	29	30	32	38
39	0	2	3	5	7	8	10	11	13	15	16	18	20	21	23	25	26	28	30	31	33	39
40	0	2	3	5	7	8	10	12	13	15	17	18	20	22	24	25	27	29	30	32	34	40
41	0	2	3	5	7	9	10	12	14	16	17	19	21	22	24	26	28	29	31	33	35	41
42	0	2	3	5	7	9	11	12	14	16	18	19	21	23	25	27	28	30	32	34	35	42
43	0	2	4	5	7	9	11	13	14	16	18	20	22	24	25	27	29	31	33	34	36	43
44	0	2	4	6	7	9	11	13	15	17	19	20	22	24	26	28	30	31	33	35	37	44
45	0	2	4	6	8	9	11	13	15	17	19	21	23	25	27	28	30	32	34	36	38	45
46	0	2	4	6	8	10	12	14	16	17	19	21	23	25	27	29	31	33	35	37	39	46
47	0	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	47
48	0	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	48
49	0	2	4	6	8	10	12	14	16	19	21	23	25	27	29	31	33	35	37	39	41	49
50	0	2	4	6	8	10	13	15	17	19	21	23	25	27	29	32	34	36	38	40	42	50
51	0	2	4	6	9	11	13	15	17	19	21	24	26	28	30	32	34	36	39	41	43	51
52	0	2	4	7	9	11	13	15	18	20	22	24	26	28	31	33	35	37	39	42	44	52
53	0	2	4	7	9	11	13	16	18	20	22	25	27	29	31	33	36	38	40	42	45	53
54	0	2	4	7	9	11	14	16	18	20	23	25	27	30	32	34	36	39	41	43	45	54
55	0	2	5	7	9	12	14	16	19	21	23	25	28	30	32	35	37	39	42	44	46	55
56	0	2	5	7	9	12	14	17	19	21	24	26	28	31	33	35	38	40	42	45	47	56
57	0	2	5	7	10	12	14	17	19	22	24	26	29	31	34	36	38	41	43	46	48	57
58	0	2	5	7	10	12	15	17	20	22	24	27	29	32	34	37	39	42	44	46	49	58
59	0	2	5	7	10	12	15	17	20	22	25	27	30	32	35	37	40	42	45	47	50	59
60	0	2	5	8	10	13	15	18	20	23	25	28	30	33	35	38	40	43	45	48	50½	60

Natural Versines.

′	10°	11°	12°	13°	14°	15°	16°	17°	18°	19°	′
0	0015192	0018373	0021852	0025630	0029704	0034074	0038738	0043695	0048943	0054481	0
1	0015243	0018428	0021913	0025695	0029775	0034149	0038818	0043780	0049033	0054576	1
2	15293	18484	21973	25761	29845	34225	38899	43865	49123	54671	2
3	15344	18540	22034	25827	29916	34300	38979	43951	49213	54766	3
4	0015395	0018595	0022095	0025892	0029986	0034376	0039060	0044036	0049304	0054861	4
5	15446	18651	22156	25958	30057	34452	39140	44121	49394	54956	5
6	15497	18707	22217	26024	30128	34527	39221	44207	49484	55051	6
7	0015548	0018763	0022278	0026090	0030199	0034603	0039302	0044293	0049575	0055146	7
8	15599	18819	22339	26156	30270	34679	39382	44378	49665	55242	8
9	15650	18876	22400	26222	30341	34755	39463	44464	49756	55337	9
10	0015701	0018932	0022461	0026288	0030412	0034831	0039544	0044550	0049846	0055432	10
11	15753	18988	22523	26355	30483	34907	39625	44636	49937	55528	11
12	15804	19045	22584	26421	30555	34983	39706	44722	50028	55624	12
13	0015856	0019101	0022646	0026488	0030626	0035060	0039787	0044808	0050119	0055719	13
14	15908	19158	22707	26554	30697	35136	39869	44894	50210	55815	14
15	15959	19215	22769	26621	30769	35213	39950	44980	50301	55911	15
16	0016011	0019271	0022831	0026687	0030841	0035289	0040032	0045066	0050392	0056007	16
17	16063	19328	22892	26754	30912	35366	40113	45153	50483	56103	17
18	16115	19385	22954	26821	30984	35443	40195	45239	50574	56199	18
19	0016167	0019442	0023016	0026888	0031056	0035519	0040276	0045326	0050666	0056295	19
20	16219	19499	23078	26955	31128	35596	40358	45412	50757	56391	20
21	16271	19557	23141	27022	31200	35673	40440	45499	50849	56488	21
22	0016324	0019614	0023203	0027089	0031272	0035750	0040522	0045586	0050940	0056584	22
23	16376	19671	23265	27157	31344	35827	40604	45673	51032	56681	23
24	16428	19729	23328	27224	31417	35905	40686	45760	51124	56777	24
25	0016481	0019786	0023390	0027292	0031489	0035982	0040768	0045847	0051216	0056874	25
26	16534	19844	23453	27359	31562	36059	40850	45934	51308	56971	26
27	16586	19902	23515	27427	31634	36137	40933	46021	51400	57068	27
28	0016639	0019959	0023578	0027494	0031707	0036214	0041015	0046108	0051492	0057164	28
29	16692	20017	23641	27562	31780	36292	41098	46196	51584	57261	29
30	16745	20075	23704	27630	31852	36369	41180	46283	51676	57358	30
31	0016798	0020133	0023767	0027698	0031925	0036447	0041263	0046371	0051769	0057456	31
32	16851	20191	23830	27766	31998	36525	41346	46458	51861	57553	32
33	16904	20250	23893	27834	32071	36603	41428	46546	51954	57650	33
34	0016958	0020308	0023956	0027902	0032144	0036681	0041511	0046634	0052046	0057747	34
35	17011	20366	24020	27971	32217	36759	41594	46721	52139	57845	35
36	17065	20425	24083	28039	32291	36837	41677	46809	52232	57942	36
37	0017118	0020483	0024147	0028107	0032364	0036916	0041761	0046897	0052324	0058040	37
38	17172	20542	24210	28176	32438	36994	41844	46985	52417	58138	38
39	17226	20601	24274	28245	32511	37072	41927	47074	52510	58236	39
40	0017279	0020659	0024338	0028313	0032585	0037151	0042010	0047162	0052603	0058333	40
41	17333	20718	24401	28382	32658	37230	42094	47250	52696	58431	41
42	17387	20777	24465	28451	32732	37308	42177	47338	52790	58529	42
43	0017441	0020836	0024529	0028520	0032806	0037387	0042261	0047427	0052883	0058628	43
44	17495	20895	24593	28589	32880	37466	42345	47516	52976	58726	44
45	17550	20954	24658	28658	32954	37545	42429	47604	53070	58824	45
46	0017604	0021014	0024722	0028727	0033028	0037624	0042512	0047693	0053163	0058922	46
47	17658	21073	24786	28796	33102	37703	42596	47782	53257	59021	47
48	17713	21133	24851	28866	33177	37782	42680	47871	53351	59119	48
49	0017767	0021192	0024915	0028935	0033251	0037861	0042765	0047960	0053444	0059218	49
50	17822	21252	24980	29005	33325	37941	42849	48049	53538	59316	50
51	17877	21311	25044	29074	33400	38020	42933	48138	53632	59415	51
52	0017931	0021371	0025109	0029144	0033474	0038099	0043017	0048227	0053726	0059514	52
53	17986	21431	25174	29214	33549	38179	43102	48316	53820	59613	53
54	18041	21491	25239	29283	33624	38259	43186	48406	53915	59712	54
55	0018096	0021551	0025304	0029353	0033699	0038338	0043271	0048495	0054009	0059811	55
56	18151	21611	25369	29423	33774	38418	43356	48585	54103	59910	56
57	18207	21671	25434	29493	33849	38498	43440	48674	54198	60009	57
58	0018262	0021732	0025499	0029564	0033924	0038578	0043525	0048764	0054292	0060109	58
59	18317	21792	25564	29634	33999	38658	43610	48854	54387	60208	59
60	18373	21852	25630	29704	34074	38738	43695	48943	54481	60307	60

Parts for Seconds.

	10°		11°		12°		13°		14°		15°		16°		17°		18°		19°		20°	
"	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	"
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	1
2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	2
3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	5	5	5	5	3
4	3	4	4	4	4	4	4	5	5	5	5	5	5	6	6	6	6	6	6	6	7	4
5	4	4	5	5	5	5	5	6	6	6	6	6	7	7	7	7	7	8	8	8	8	5
6	5	5	6	6	6	6	7	7	7	7	8	8	8	8	9	9	9	9	9	10	10	6
7	6	6	6	7	7	7	8	8	8	8	9	9	9	10	10	10	10	11	11	11	12	7
8	7	7	7	8	8	8	9	9	9	10	10	10	11	11	11	12	12	12	13	13	13	8
9	8	8	8	9	9	9	10	10	11	11	11	11	12	12	13	13	13	14	14	15	15	9
10	8	9	9	10	10	10	11	11	12	12	13	13	13	14	14	15	15	15	16	16	17	10
11	9	10	10	11	11	12	12	12	13	13	14	14	15	15	16	16	16	17	17	18	18	11
12	10	11	11	12	12	13	13	14	14	15	15	16	16	17	17	17	18	18	19	19	20	12
13	11	11	12	13	13	14	14	15	15	16	16	17	17	18	18	19	19	20	21	21	22	13
14	12	12	13	14	14	15	15	16	16	17	18	18	19	19	20	20	21	22	22	23	23	14
15	13	13	14	15	15	16	16	17	18	18	19	19	20	21	21	22	22	23	24	24	25	15
16	13	14	15	15½	16	17	17	18	19	19	20	21	21	22	23	23	24	25	25	26	27	16
17	14	15	16	16	17	18	19	19	20	21	21	22	23	23	24	25	25	26	27	28	28	17
18	15	16	17	17	18	19	20	20	21	22	23	23	24	25	26	26	27	28	28	29	30	18
19	16	17	18	18	19	20	21	22	22	23	24	25	25	26	27	28	28	29	30	31	32	19
20	17	18	19	19	20	21	22	23	23	24	25	26	27	28	28	29	30	31	32	32	33	20
21	18	19	19	20	21	22	23	24	25	25	26	27	28	29	30	31	31	32	33	34	35	21
22	19	19	20	21	22	23	24	25	26	27	28	28	29	30	31	32	33	34	35	36	36	22
23	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	34	35	36	37	38	23
24	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	24
25	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	25
26	22	23	24	25	26	27	28	29	31	32	33	34	35	36	37	38	39	40	41	42	43	26
27	23	24	25	26	27	28	29	31	32	33	34	35	36	37	38	39	41	42	43	44	45	27
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29	24	26	27	28	29	30	32	33	34	35	36	38	39	40	41	42	43	45	46	47	48	29
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31	26	27	29	30	31	33	34	35	36	38	39	40	41	43	44	45	46	48	49	50	51	31
32	27	28	30	31	32	34	35	36	38	39	40	41	43	44	45	47	48	49	51	52	53	32
33	28	29	31	32	33	35	36	37	39	40	41	43	44	45	47	48	49	51	52	53	55	33
34	29	30	31	33	34	36	37	38	40	41	43	44	45	47	48	50	51	52	54	55	56	34
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36	30	32	33	35	36	38	39	41	42	44	45	47	48	50	51	52	54	55	57	58	60	36
37	31	33	34	36	37	39	40	42	43	45	46	48	49	51	52	54	55	57	58	60	61	37
38	32	34	35	37	38	40	41	43	45	46	48	49	51	52	54	55	57	58	60	61	63	38
39	33	34	36	38	39	41	43	44	46	47	49	50	52	54	55	57	58	60	62	63	65	39
40	34	35	37	39	40	42	44	45	47	49	50	52	53	55	57	58	60	62	63	65	66	40
41	35	36	38	40	41	43	45	46	48	50	51	53	55	56	58	60	61	63	65	66	68	41
42	35	37	39	41	42	44	46	48	49	51	53	54	56	58	60	61	63	65	66	68	70	42
43	36	38	40	42	43	45	47	49	50	52	54	56	57	59	61	63	65	66	68	70	71	43
44	37	39	41	43	44	46	48	50	52	53	55	57	59	61	62	64	66	68	69	71	73	44
45	38	40	42	44	45	47	49	51	53	55	56	58	60	62	64	66	67	69	71	73	75	45
46	39	41	43	44	46	48	50	52	54	56	58	60	61	63	65	67	69	71	73	74	76	46
47	40	42	43	45	47	49	51	53	55	57	59	61	63	65	67	69	70	72	74	76	78	47
48	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	76	78	80	48
49	41	43	45	47	49	51	53	55	57	59	61	63	65	68	69	71	73	75	77	79	81	49
50	42	44	46	48	50	52	55	57	59	61	63	65	67	69	71	73	75	77	79	80	83	50
51	43	45	46	49	51	54	56	58	60	62	64	66	68	70	72	74	76	78	80	83	85	51
52	44	46	47	50	52	55	57	59	61	63	65	67	69	72	74	76	78	80	82	84	86	52
53	45	47	48	51	53	56	58	60	62	64	67	69	71	73	75	77	79	82	84	86	88	53
54	45	48	49	52	54	57	59	61	63	66	68	70	72	74	77	79	80	83	85	87	90	54
55	46	49	50	53	55	58	60	62	65	67	69	71	73	76	78	80	82	85	87	89	91	55
56	47	49	51	54	56	59	61	63	66	68	70	73	74	77	79	82	84	86	88	91	93	56
57	48	50	52	55	57	60	62	65	67	69	72	74	76	78	81	83	85	88	90	92	95	57
58	49	51	53	56	58	61	63	66	68	70	73	75	77	80	82	85	87	89	92	94	96	58
59	50	52	54	57	59	62	64	67	69	72	74	76	79	81	84	86	88	91	93	95	98	59
60	50½	53	55½	58	60½	63	65½	68	70	73	75	78	80	83	85	87½	90	92	95	97	99½	60

Natural Versines.

′	20°	21°	22°	23°	24°	25°	26°	27°	28°	29°	′
0	0060307	0066420	0072816	0079495	0086454	0093692	0101206	0108993	0117052	0125380	0
1	0060407	0066524	0072925	0079609	0086573	0093815	0101333	0109126	0117189	0125521	1
2	60506	66628	73034	79723	86691	93938	01461	09258	17326	25662	2
3	60606	66733	73143	79836	86810	94061	01589	09390	17462	25804	3
4	0060706	0066837	0073253	0079950	0086928	0094185	0101717	0109522	0117599	0125945	4
5	60806	66942	73362	80064	87047	94308	01844	09655	17736	26086	5
6	60906	67046	73471	80178	87166	94431	01972	09787	17873	26228	6
7	0061006	0067151	0073581	0080293	0087285	0094555	0102100	0109920	0118010	0126369	7
8	61106	67256	73690	80407	87403	94678	02228	10052	18147	26511	8
9	61206	67361	73800	80521	87522	94802	02357	10185	18284	26652	9
10	0061306	0067466	0073910	0080636	0087642	0094925	0102485	0110318	0118422	0126794	10
11	61407	67571	74019	80750	87761	95049	02613	10451	18559	26936	11
12	61507	67676	74129	80865	87880	95173	02742	10584	18696	27078	12
13	0061607	0067781	0074239	0080979	0087999	0095297	0102870	0110717	0118834	0127220	13
14	61708	67887	74349	81094	88118	95421	02999	10850	18972	27362	14
15	61809	67992	74459	81209	88238	95545	03127	10983	19109	27504	15
16	0061909	0068098	0074570	0081324	0088357	0095669	0103256	0111116	0119247	0127646	16
17	62010	68203	74680	81439	88477	95793	03385	11249	19385	27788	17
18	62111	68309	74790	81554	88597	95917	03514	11383	19523	27931	18
19	0062212	0068414	0074901	0081669	0088716	0096042	0103642	0111516	0119661	0128073	19
20	62313	68520	75011	81784	88836	96166	03771	11650	19799	28216	20
21	62414	68626	75122	81899	88956	96291	03901	11783	19937	28358	21
22	0062515	0068732	0075232	0082014	0089076	0096415	0104030	0111917	0120075	0128501	22
23	62617	68838	75343	82130	89196	96540	04159	12051	20213	28643	23
24	62718	68944	75454	82245	89316	96665	04288	12185	20351	28786	24
25	0062819	0069050	0075565	0082361	0089436	0096789	0104418	0112318	0120490	0128929	25
26	62921	69157	75676	82477	89557	96914	04547	12452	20628	29072	26
27	63023	69263	75787	82592	89677	97039	04677	12587	20767	29215	27
28	0063124	0069369	0075898	0082708	0089798	0097164	0104806	0112721	0120905	0129358	28
29	63226	69476	76009	82824	89918	97289	04936	12855	21044	29501	29
30	63328	69582	76120	82940	90039	97415	05066	12989	21183	29644	30
31	0063430	0069689	0076232	0083056	0090159	0097540	0105195	0113123	0121322	0129788	31
32	63532	69796	76343	83172	90280	97665	05325	13258	21461	29931	32
33	63634	69903	76455	83288	90401	97791	05455	13392	21600	30074	33
34	0063736	0070009	0076566	0083404	0090522	0097916	0105585	0113527	0121739	0130218	34
35	63838	70116	76678	83521	90643	98042	05716	13662	21878	30361	35
36	63940	70223	76790	83637	90764	98167	05846	13796	22017	30505	36
37	0064043	0070331	0076902	0083754	0090885	0098293	0105976	0113931	0122156	0130649	37
38	64145	70438	77013	83870	91006	98419	06106	14066	22296	30793	38
39	64248	70545	77125	83987	91127	98545	06237	14201	22435	30936	39
40	0064350	0070652	0077238	0084104	0091249	0098671	0106367	0114336	0122575	0131080	40
41	64453	70760	77350	84220	91370	98797	06498	14471	22714	31224	41
42	64556	70867	77462	84337	91492	98923	06629	14606	22854	31368	42
43	0064659	0070975	0077574	0084454	0091613	0099049	0106759	0114742	0122994	0131513	43
44	64762	71083	77687	84571	91735	99175	06890	14877	23133	31657	44
45	64865	71190	77799	84688	91857	99302	07021	15012	23273	31801	45
46	0064968	0071298	0077912	0084806	0091979	0099428	0107152	0115148	0123413	0131946	46
47	65071	71406	78024	84923	92100	99555	07283	15283	23553	32090	47
48	65174	71514	78137	85040	92222	99681	07414	15419	23693	32234	48
49	0065278	0071622	0078250	0085158	0092345	0099808	0107545	0115555	0123833	0132379	49
50	65381	71730	78362	85275	92467	99935	07677	15690	23974	32524	50
51	65485	71839	78475	85393	92589	100061	07808	15826	24114	32669	51
52	0065588	0071947	0078588	0085510	0092711	0100188	0107939	0115962	0124254	0132813	52
53	65692	72055	78701	85628	92833	00315	08071	16098	24395	32958	53
54	65795	72164	78815	85746	92956	00442	08202	16234	24535	33103	54
55	0065899	0072272	0078928	0085864	0093078	0100569	0108334	0116370	0124676	0133248	55
56	66003	72381	79041	85982	93201	00696	08466	16507	24817	33393	56
57	66107	72490	79154	86100	93324	00824	08598	16643	24957	33539	57
58	0066211	0072598	0079268	0086218	0093446	0100951	0108729	0116779	0125098	0133684	58
59	66315	72707	79381	86336	93569	01078	08861	16916	25239	33829	59
60	66420	72816	79495	86454	93692	01206	08993	17052	25380	33975	60

Parts for Seconds.

	20°		21°		22°		23°		24°		25°		26°		27°		28°		29°		30°	
	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	″
1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1
2	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	5	5	5	5	5	5	2
3	5	5	5	5	5	6	6	6	6	6	6	6	6	6	7	7	7	7	7	7	7	3
4	7	7	7	7	7	7	8	8	8	8	8	8	9	9	9	9	9	9	9	10	10	4
5	8	8	9	9	9	9	9	10	10	10	10	10	11	11	11	11	11	12	12	12	12	5
6	10	10	10	11	11	11	11	12	12	12	12	13	13	13	13	13	14	14	14	14	15	6
7	12	12	12	12	13	13	13	14	14	14	14	15	15	15	15	16	16	16	16	17	17	7
8	13	14	14	14	15	15	15	15	16	16	16	17	17	17	18	18	18	19	19	19	19	8
9	15	15	16	16	16	17	17	17	18	18	18	19	19	19	20	20	20	21	21	21	22	9
10	17	17	17	18	18	19	19	19	20	20	20	21	21	22	22	22	23	23	24	24	24	10
11	18	19	19	20	20	20	21	21	22	22	23	23	23	24	24	25	25	25	26	26	27	11
12	20	20	21	21	22	22	23	23	24	24	25	25	25	26	26	27	27	28	28	29	29	12
13	22	22	23	23	24	24	25	25	26	26	27	27	28	28	29	29	30	30	31	31	32	13
14	23	24	24	25	25	26	27	27	28	28	29	29	30	30	31	31	32	32	33	33	34	14
15	25	25	26	27	27	28	28	29	30	30	31	31	32	32	33	34	34	35	35	36	36	15
16	27	27	28	28	29	30	30	31	32	32	33	33	34	35	35	36	36	37	38	38	39	16
17	28	29	30	30	31	32	32	33	34	34	35	35	36	37	37	38	39	39	40	41	41	17
18	30	31	31	32	33	33	34	35	35	36	37	38	38	39	40	40	41	42	42	43	44	18
19	32	32	33	34	35	35	36	37	37	38	39	40	40	41	42	43	43	44	45	45	46	19
20	33	34	35	36	36	37	38	39	39	40	41	42	42	43	44	45	46	46	47	48	48	20
21	35	36	36	37	38	39	40	41	41	42	43	44	45	45	46	47	48	49	49	50	51	21
22	36	37	38	39	40	41	42	43	43	44	45	46	47	48	48	49	50	51	52	53	53	22
23	38	39	40	41	42	43	44	44	45	46	47	48	49	50	51	51	52	53	54	55	56	23
24	40	41	42	43	44	45	45	46	47	48	49	50	51	52	53	54	55	56	56	57	58	24
25	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	25
26	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	61	63	26
27	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	63	65	27
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29	48	49	50	52	53	54	55	56	57	58	59	61	62	63	64	65	66	67	68	69	70	29
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31	51	53	54	55	56	58	59	60	61	62	64	65	66	67	68	69	71	72	73	74	75	31
32	53	54	56	57	58	59	61	62	63	64	66	67	68	69	70	72	73	74	75	76	78	32
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36	60	61	63	64	65	67	68	70	71	72	74	75	76	78	79	81	82	83	85	86	87	36
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40	66	68	70	71	73	74	76	77	79	80	82	83	85	87	88	90	91	93	94	95	97	40
41	68	70	71	73	74	76	78	79	81	82	84	86	87	89	90	92	93	95	96	98	99	41
42	70	71	73	75	76	78	80	81	83	84	86	88	89	91	92	94	96	97	99	100	102	42
43	71	73	74	76	78	80	81	83	85	86	88	90	91	93	95	96	98	99	101	103	104	43
44	73	75	76	78	80	82	83	85	87	88	90	92	93	95	97	98	100	102	103	105	107	44
45	75	76	78	80	82	83	85	87	89	90	92	94	96	97	99	101	102	104	106	107	109	45
46	76	78	80	82	84	85	87	89	91	92	94	96	98	100	101	103	105	106	108	110	112	46
47	78	80	82	84	85	87	89	91	93	95	96	98	100	102	103	105	107	109	110	112	114	47
48	80	81	83	85	87	89	91	93	95	97	98	100	102	104	106	107	109	111	113	115	116	48
49	81	83	85	87	89	91	93	95	97	99	100	102	104	106	108	110	112	113	115	117	119	49
50	83	85	87	89	91	93	95	97	99	101	102	104	106	108	110	112	114	116	118	119	121	50
51	85	87	89	91	93	95	97	99	101	103	105	106	108	110	112	114	116	118	120	122	124	51
52	86	88	90	92	94	96	98	101	103	105	107	109	110	112	114	116	118	120	122	124	126	52
53	88	90	92	94	96	98	100	102	105	107	109	111	113	115	117	119	121	123	125	127	128	53
54	90	92	94	96	98	100	102	104	106	109	111	113	115	117	119	121	123	125	127	129	131	54
55	91	93	96	98	100	102	104	106	108	111	113	115	117	119	121	123	125	127	129	131	133	55
56	93	95	97	99	102	104	106	108	110	113	115	117	119	121	123	125	127	130	132	134	136	56
57	95	97	99	101	104	106	108	110	112	115	117	119	121	123	125	128	130	132	134	136	138	57
58	96	98	101	103	105	108	110	112	114	117	119	121	123	125	128	130	132	134	136	138	141	58
59	98	100	103	105	107	109	112	114	116	119	121	123	125	128	130	131	134	137	139	141	143	59
60	99	102	104	107	109	111	114	116	118	121	123	125	127	130	132	134	136	139	141	143	145	60

Natural Versines.

′	30°	31°	32°	33°	34°	35°	36°	37°	38°	39°	′
0	0133975	0142833	0151952	0161329	0170962	0180848	0190983	0201364	0211989	0222854	0
1	0134120	0142983	0152106	0161488	0171125	0181015	0191154	0201540	0212168	0223037	1
2	34266	43132	52260	61646	71288	81182	91325	01715	12348	23220	2
3	34411	43282	52415	61805	71451	81349	91496	01890	12527	23403	3
4	0134557	0143433	0152569	0161964	0171614	0181516	0191667	0202065	0212706	0223587	4
5	34703	43583	52723	62122	71777	81683	91839	02241	12885	23770	5
6	34849	43733	52878	62281	71940	81850	92010	02416	13065	23954	6
7	0134994	0143883	0153033	0162440	0172103	0182018	0192181	0202592	0213244	0224137	7
8	35140	44034	53187	62599	72266	82185	92353	02767	13424	24321	8
9	35287	44184	53342	62758	72429	82352	92525	02943	13604	24504	9
10	0135433	0144334	0153497	0162917	0172593	0182520	0192696	0203119	0213783	0224688	10
11	35579	44485	53652	63076	72756	82687	92868	03294	13963	24872	11
12	35725	44636	53807	63236	72919	82855	93040	03470	14143	25055	12
13	0135872	0144786	0153962	0163395	0173083	0183023	0193211	0203646	0214323	0225239	13
14	36018	44937	54117	63554	73247	83191	93383	03822	14503	25423	14
15	36164	45088	54272	63714	73410	83358	93555	03998	14683	25607	15
16	0136311	0145239	0154427	0163873	0173574	0183526	0193727	0204174	0214863	0225791	16
17	36458	45390	54583	64033	73738	83694	93899	04350	15043	25976	17
18	36604	45541	54738	64193	73902	83862	94072	04526	15224	26160	18
19	0136751	0145692	0154894	0164352	0174066	0184030	0194244	0204703	0215404	0226344	19
20	36898	45844	55049	64512	74230	84199	94416	04879	15584	26528	20
21	37045	45995	55205	64672	74394	84367	94589	05056	15765	26713	21
22	0137192	0146146	0155360	0164832	0174558	0184535	0194761	0205232	0215945	0226897	22
23	37339	46298	55516	64992	74722	84704	94934	05409	16126	27082	23
24	37486	46449	55672	65152	74886	84872	95106	05585	16306	27266	24
25	0137634	0146601	0155828	0165312	0175051	0185041	0195279	0205762	0216487	0227451	25
26	37781	46752	55984	65473	75215	85209	95452	05939	16668	27636	26
27	37928	46904	56140	65633	75380	85378	95624	06116	16849	27821	27
28	0138076	0147056	0156296	0165793	0175544	0185547	0195797	0206293	0217030	0228005	28
29	38223	47208	56452	65954	75709	85716	95970	06470	17211	28190	29
30	38371	47360	56609	66114	75874	85884	96143	06647	17392	28375	30
31	0138518	0147512	0156765	0166275	0176039	0186053	0196316	0206824	0217573	0228560	31
32	38666	47664	56921	66435	76203	86222	96489	07001	17754	28745	32
33	38814	47816	57078	66596	76368	86392	96662	07178	17935	28931	33
34	0138962	0147968	0157234	0166757	0176533	0186561	0196836	0207355	0218117	0229116	34
35	39110	48121	57391	66918	76698	86730	97009	07533	18298	29301	35
36	39258	48273	57548	67079	76864	86899	97182	07710	18479	29487	36
37	0139406	0148425	0157704	0167240	0177029	0187069	0197356	0207888	0218661	0229672	37
38	39554	48578	57861	67401	77194	87238	97529	08065	18843	29858	38
39	39702	48731	58018	67562	77359	87407	97703	08243	19024	30043	39
40	0139850	0148883	0158175	0167723	0177525	0187577	0197877	0208421	0219206	0230229	40
41	39999	49036	58332	67884	77690	87747	98050	08599	19388	30415	41
42	40148	49189	58489	68046	77856	87916	98224	08776	19570	30600	42
43	0140296	0149342	0158646	0168207	0178022	0188086	0198398	0208954	0219751	0230786	43
44	40445	49495	58804	68369	78187	88256	98572	09132	19933	30972	44
45	40594	49648	58961	68530	78353	88426	98746	09310	20115	31158	45
46	0140742	0149801	0159118	0168692	0178519	0188596	0198920	0209488	0220298	0231344	46
47	40891	49954	59276	68854	78685	88766	99094	09667	20480	31530	47
48	41040	50107	59433	69015	78851	88936	99269	09845	20662	31716	48
49	0141189	0150261	0159591	0169177	0179017	0189106	0199443	0210023	0220844	0231903	49
50	41338	50414	59749	69339	79183	89277	99617	10202	21027	32089	50
51	41487	50567	59906	69501	79349	89447	99792	10380	21209	32275	51
52	0141636	0150721	0160064	0169663	0179515	0189617	0199966	0210559	0221392	0232461	52
53	41786	50875	60222	69825	79682	89788	200141	10737	21574	32648	53
54	41935	51028	60380	69988	79848	89958	00315	10916	21757	32835	54
55	0142084	0151182	0160538	0170150	0180015	0190129	0200490	0211095	0221940	0233021	55
56	42234	51336	60696	70312	80181	90300	00665	11273	22122	33208	56
57	42384	51490	60854	70475	80348	90470	00840	11452	22305	33395	57
58	0142533	0151644	0161013	0170637	0180514	0190641	0201014	0211631	0222488	0233582	58
59	42683	51798	61171	70800	80681	90812	01189	11810	22671	33769	59
60	42833	51952	61329	70962	80848	90983	01364	11989	22854	33956	60

Parts for Seconds.

	30°		31°		32°		33°		34°		35°		36°		37°		38°		39°		40°	
"	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	"
1	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	1
2	5	5	5	5	5	5	5	5	5	5	6	6	6	6	6	6	6	6	6	6	6	2
3	7	7	7	8	8	8	8	8	8	8	8	8	9	9	9	9	9	9	9	9	9	3
4	10	10	10	10	10	10	11	11	11	11	11	11	11	12	12	12	12	12	12	12	12	4
5	12	12	12	13	13	13	13	13	14	14	14	14	14	14	15	15	15	15	15	15	16	5
6	15	15	15	15	15	16	16	16	16	16	17	17	17	17	18	18	18	18	18	19	19	6
7	17	17	17	18	18	18	18	19	19	19	19	20	20	20	20	21	21	21	21	22	22	7
8	19	20	20	20	21	21	21	21	22	22	22	23	23	23	23	24	24	24	24	25	25	8
9	22	22	22	23	23	23	24	24	24	25	25	25	26	26	26	27	27	27	27	28	28	9
10	24	25	25	25	26	26	26	27	27	27	28	28	28	29	29	30	30	30	31	31	31	10
11	27	27	27	28	28	29	29	29	30	30	31	31	31	32	32	32	33	33	34	34	34	11
12	29	30	30	30	31	31	32	32	33	33	33	34	34	35	35	35	36	36	37	37	37	12
13	32	32	32	33	33	34	34	35	35	36	36	37	37	37	38	38	39	39	40	40	41	13
14	34	34	35	35	36	36	37	37	38	38	39	39	40	40	41	41	42	42	43	43	44	14
15	36	37	37	38	39	39	40	40	41	41	42	42	43	43	44	44	45	45	46	46	47	15
16	39	39	40	41	41	42	42	43	44	44	44	45	46	46	47	47	48	48	49	49	50	16
17	41	42	42	43	44	44	45	45	46	47	47	48	48	49	50	50	51	51	52	52	53	17
18	44	44	45	46	46	47	48	48	49	49	50	51	51	52	53	53	54	54	55	56	56	18
19	46	47	47	48	49	49	50	51	52	52	53	53	54	55	55	56	57	57	58	59	59	19
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22	53	54	55	56	57	57	58	59	60	60	61	62	63	63	64	65	66	66	67	68	69	22
23	56	57	57	58	59	60	61	62	63	63	64	65	66	66	67	68	69	69	70	71	72	23
24	58	59	60	61	62	63	63	64	65	66	67	68	68	69	70	71	72	72	73	74	75	24
25	61	62	62	63	64	65	66	67	68	69	70	70	71	72	73	74	75	75	76	77	78	25
26	63	64	65	66	67	68	69	70	71	71	72	73	74	75	76	77	78	78	79	80	81	26
27	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	81	82	83	84	27
28	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	84	85	86	87	28
29	70	71	72	73	75	76	77	78	79	80	81	82	83	84	85	86	87	87	88	89	90	29
30	73	74	75	76	77	78	79	80	82	82	83	84	85	87	88	89	90	91	92	93	93	30
31	75	76	77	79	80	81	82	83	84	85	86	87	88	89	90	91	93	94	95	96	97	31
32	78	79	80	81	82	83	85	86	87	88	89	90	91	92	93	94	96	97	98	99	100	32
33	80	81	82	84	85	86	87	88	90	91	92	93	94	95	96	97	98	100	101	102	103	33
34	82	84	85	86	87	89	90	91	92	93	95	96	97	98	99	100	101	103	104	105	106	34
35	85	86	87	89	90	91	92	94	95	96	97	99	100	101	102	103	104	106	107	108	109	35
36	87	89	90	91	92	94	95	96	98	99	100	101	103	104	106	106	107	109	110	111	112	36
37	90	91	92	94	95	96	98	99	101	102	103	104	105	107	108	109	110	112	113	114	115	37
38	92	94	95	96	98	99	100	102	103	104	106	107	108	110	111	112	113	115	116	117	118	38
39	95	96	97	99	100	102	103	104	106	107	108	110	111	112	114	115	116	118	119	120	122	39
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42	102	103	105	106	108	109	111	112	114	115	117	118	120	121	123	124	125	127	128	130	131	42
43	104	106	107	109	110	112	114	115	117	118	120	121	123	124	125	127	128	130	131	133	134	43
44	107	108	110	111	113	115	116	118	120	121	122	124	125	127	128	130	131	133	134	136	137	44
45	109	111	112	114	116	117	119	120	122	124	125	127	128	130	131	133	134	136	137	139	140	45
46	112	113	115	117	118	120	121	123	125	126	128	130	131	133	134	136	137	139	140	142	143	46
47	114	116	117	119	121	122	124	126	128	129	131	132	134	136	137	139	140	142	143	145	146	47
48	116	118	120	122	123	125	127	128	131	132	133	135	137	138	140	142	143	145	146	148	150	48
49	119	121	122	124	126	128	129	131	133	135	136	138	140	141	143	145	146	148	149	151	153	49
50	121	123	125	127	128	130	132	134	136	137	139	141	142	144	146	148	149	151	152	154	156	50
51	124	126	127	129	131	133	135	136	139	140	142	144	145	147	149	150	152	154	156	157	159	51
52	126	128	130	132	134	135	137	139	141	143	145	146	148	150	152	153	155	157	159	160	162	52
53	128	130	132	134	136	138	140	142	144	146	147	149	151	153	155	156	158	160	162	163	165	53
54	131	133	135	137	139	141	143	144	147	148	150	152	154	156	158	159	161	163	165	167	168	54
55	133	135	137	139	141	143	145	147	150	151	153	155	157	159	160	162	164	166	168	170	171	55
56	136	138	140	142	144	146	148	150	152	154	156	158	160	162	163	165	167	169	171	173	174	56
57	138	140	142	144	146	148	151	153	155	157	159	160	162	164	166	168	170	172	174	176	178	57
58	141	143	145	147	149	151	153	155	158	159	161	163	165	167	169	171	173	175	177	179	181	58
59	143	145	147	150	152	154	156	158	160	162	164	166	168	170	172	174	176	178	180	182	184	59
60	145	148	150	152	154	156	158	161	163	165	167	169	171	173	175	177	179	181	183	185	187	60

Natural Versines.

′	40°	41°	42°	43°	44°	45°	46°	47°	48°	49°	′
0	0233956	0245290	0256855	0268646	0280660	0292893	0305342	0318002	0330869	0343941	0
1	0234143	0245481	0257050	0268845	0280862	0293099	0305551	0318214	0331086	0344160	1
2	34330	45672	57245	69043	81064	93305	05760	18427	31302	44380	2
3	34517	45863	57439	69242	81267	93511	05970	18640	31518	44600	3
4	0234704	0246054	0257634	0269440	0281469	0293716	0306179	0318853	0331734	0344820	4
5	34891	46245	57829	69639	81671	93922	06389	19066	31951	45039	5
6	35079	46437	58024	69838	81874	94128	06598	19279	32167	45259	6
7	0235266	0246628	0258219	0270036	0282076	0294334	0306808	0319492	0332384	0345479	7
8	35453	46819	58414	70235	82279	94541	07017	19705	32601	45699	8
9	35641	47011	58609	70434	82481	94747	07227	19919	32817	45919	9
10	0235829	0247202	0258805	0270633	0282684	0294953	0307437	0320132	0333034	0346139	10
11	36016	47393	59000	70832	82887	95159	07647	20345	33251	46359	11
12	36204	47585	59195	71031	83089	95366	07857	20559	33467	46579	12
13	0236392	0247777	0259391	0271230	0283292	0295572	0308067	0320772	0333684	0346800	13
14	36580	47968	59586	71430	83495	95779	08277	20986	33901	47020	14
15	36767	48160	59782	71629	83698	95985	08487	21199	34118	47240	15
16	0236955	0248352	0259977	0271828	0283901	0296192	0308697	0321413	0334335	0347461	16
17	37144	48544	60173	72028	84104	96399	08907	21627	34552	47681	17
18	37332	48736	60369	72227	84307	96605	09118	21840	34770	47902	18
19	0237520	0248928	0260565	0272427	0284510	0296812	0309328	0322054	0334987	0348122	19
20	37708	49120	60761	72626	84714	97019	09538	22268	35204	48343	20
21	37896	49312	60956	72826	84917	97226	09749	22482	35421	48563	21
22	0238085	0249504	0261152	0273026	0285120	0297433	0309959	0322696	0335639	0348784	22
23	38273	49697	61348	73225	85324	97640	10170	22910	35856	49005	23
24	38462	49889	61545	73425	85527	97847	10380	23124	36074	49226	24
25	0238650	0250081	0261741	0273625	0285731	0298054	0310591	0323338	0336291	0349447	25
26	38839	50274	61937	73825	85934	98261	10802	23552	36509	49668	26
27	39028	50466	62133	74025	86138	98469	11013	23767	36727	49889	27
28	0239216	0250659	0262330	0274225	0286342	0298676	0311223	0323981	0336944	0350110	28
29	39405	50852	62526	74425	86546	98883	11434	24195	37162	50331	29
30	39594	51044	62723	74626	86750	99091	11645	24410	37380	50552	30
31	0239783	0251237	0262919	0274826	0286953	0299298	0311856	0324624	0337598	0350773	31
32	39972	51430	63116	75026	87157	99506	12067	24839	37816	50994	32
33	40161	51623	63312	75227	87361	99713	12279	25053	38034	51216	33
34	0240350	0251816	0263509	0275427	0287566	0299921	0312490	0325268	0338252	0351437	34
35	40539	52009	63706	75628	87770	300129	12701	25483	38470	51659	35
36	40729	52202	63903	75828	87974	00337	12912	25698	38688	51880	36
37	0240918	0252395	0264100	0276029	0288178	0300544	0313124	0325912	0338906	0352102	37
38	41107	52588	64297	76229	88383	00752	13335	26127	39125	52323	38
39	41297	52782	64494	76430	88587	00960	13547	26342	39343	52545	39
40	0241486	0252975	0264691	0276631	0288791	0301168	0313758	0326557	0339561	0352767	40
41	41676	53168	64888	76832	88996	01377	13970	26772	39780	52988	41
42	41866	53362	65085	77033	89200	01585	14182	26987	39998	53210	42
43	0242055	0253555	0265283	0277234	0289405	0301793	0314393	0327203	0340217	0353432	43
44	42245	53749	65480	77435	89610	02001	14605	27418	40435	53654	44
45	42435	53943	65677	77636	89815	02209	14817	27633	40654	53876	45
46	0242625	0254136	0265875	0277837	0290019	0302418	0315029	0327848	0340873	0354098	46
47	42815	54330	66072	78038	90224	02626	15241	28064	41092	54320	47
48	43005	54524	66270	78240	90429	02835	15453	28279	41310	54542	48
49	0243195	0254718	0266468	0278441	0290634	0303043	0315665	0328495	0341529	0354764	49
50	43385	54912	66665	78643	90839	03252	15877	28710	41748	54987	50
51	43575	55106	66863	78844	91044	03461	16089	28926	41967	55209	51
52	0243766	0255300	0267061	0279046	0291250	0303669	0316302	0329142	0342188	0355431	52
53	43956	55494	67259	79247	91455	03878	16514	29358	42406	55654	53
54	44146	55688	67457	79449	91660	04087	16726	29573	42625	55876	54
55	0244337	0255883	0267655	0279651	0291865	0304296	0316939	0329789	0342844	0356099	55
56	44528	56077	67853	79852	92071	04505	17151	30005	43063	56321	56
57	44718	56271	68051	80054	92276	04714	17364	30221	43283	56544	57
58	0244909	0256466	0268250	0280256	0292482	0304923	0317576	0330437	0343502	0356767	58
59	45100	56661	68448	80458	92688	05132	17789	30653	43721	56990	59
60	45290	56855	68646	80660	92893	05342	18002	30869	43941	57212	60

Parts for Seconds.

	40°		41°		42°		43°		44°		45°		46°		47°		48°		49°		50°	
″	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	″
1	3	3	3	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	1
2	6	6	6	6	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	2
3	9	9	10	10	10	10	10	10	10	10	10	10	10	11	11	11	11	11	11	11	11	3
4	12	13	13	13	13	13	13	13	13	14	14	14	14	14	14	14	14	15	15	15	15	4
5	16	16	16	16	16	16	17	17	17	17	17	17	17	18	18	18	18	18	18	18	19	5
6	19	19	19	19	19	20	20	20	20	20	21	21	21	21	21	21	22	22	22	22	22	6
7	22	22	22	22	23	23	23	23	24	24	24	24	24	25	25	25	25	25	26	26	26	7
8	25	25	25	26	26	26	26	27	27	27	27	28	28	28	28	29	29	29	29	29	30	8
9	28	28	29	29	29	29	30	30	30	31	31	31	31	32	32	32	32	33	33	33	33	9
10	31	31	32	32	32	33	33	33	34	34	34	35	35	35	35	36	36	36	37	37	37	10
11	34	35	35	35	36	36	36	37	37	37	38	38	38	39	39	39	40	40	40	41	41	11
12	37	38	38	39	39	39	40	40	40	41	41	41	42	42	43	43	43	44	44	44	45	12
13	41	41	41	42	42	43	43	43	44	44	45	45	45	46	46	46	47	47	48	48	48	13
14	44	44	45	45	45	46	46	47	47	47	48	48	49	49	50	50	50	51	51	52	52	14
15	47	47	48	48	49	49	50	50	51	51	51	52	52	53	53	54	54	54	55	55	56	15
16	50	50	51	51	52	52	53	53	54	54	55	55	56	56	57	57	58	58	59	59	59	16
17	53	54	54	55	55	56	56	57	57	58	58	59	59	60	60	61	61	62	62	63	63	17
18	56	57	57	58	58	59	60	60	61	61	62	62	63	63	64	64	65	65	66	66	67	18
19	59	60	60	61	62	62	63	63	64	65	65	66	66	67	67	68	68	60	70	70	71	19
20	62	63	64	64	65	65	66	67	67	68	69	69	70	70	71	71	72	73	73	74	74	20
21	65	66	67	67	68	69	69	70	70	71	72	73	73	74	74	75	76	76	77	77	78	21
22	69	69	70	71	71	72	73	73	74	75	75	76	77	77	78	79	79	80	80	81	82	22
23	72	72	73	74	75	75	76	77	77	78	79	80	80	81	82	82	83	84	84	85	85	23
24	75	76	76	77	78	79	79	80	81	82	82	83	84	84	85	86	86	87	88	88	89	24
25	78	79	80	80	81	82	83	83	84	85	86	86	87	88	89	89	90	91	91	92	93	25
26	81	82	83	84	84	85	86	87	87	88	89	90	91	91	92	93	94	94	95	96	97	26
27	84	85	86	87	88	88	89	90	91	92	92	93	94	95	96	97	97	98	99	100	100	27
28	87	88	89	90	91	92	93	93	94	96	96	97	98	98	99	100	101	102	102	103	104	28
29	90	91	92	93	94	95	96	97	98	99	99	100	101	102	103	104	104	105	106	107	108	29
30	93	94	95	96	97	98	99	100	101	102	103	104	105	105	106	107	108	109	110	111	111	30
31	97	98	99	100	101	102	103	103	104	105	106	107	108	109	110	111	112	113	113	114	115	31
32	100	101	102	103	104	105	106	107	108	109	110	111	112	113	113	114	115	116	117	118	119	32
33	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	33
34	106	107	108	109	110	111	112	113	114	116	117	118	119	120	121	121	123	123	124	125	126	34
35	109	110	111	112	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	35
36	112	113	115	116	117	118	119	120	121	122	123	124	126	127	128	129	130	131	132	133	134	36
37	115	117	118	119	120	121	122	123	125	126	127	128	129	130	131	132	133	134	135	136	137	37
38	118	120	121	122	123	124	126	127	128	129	130	131	133	134	135	136	137	138	139	140	141	38
39	122	123	124	125	126	128	129	130	131	132	134	135	136	137	138	139	141	142	143	144	145	39
40	125	126	127	128	130	131	132	133	135	136	137	138	139	141	142	143	144	145	146	147	149	40
41	128	129	130	132	133	134	136	137	138	139	141	142	143	144	145	147	148	149	150	151	152	41
42	131	132	134	135	136	138	139	140	141	143	144	145	146	148	149	150	151	152	154	155	156	42
43	134	135	137	138	139	141	142	144	145	146	147	149	150	151	152	154	155	156	157	159	160	43
44	137	139	140	141	143	144	145	147	148	150	151	152	153	155	156	157	159	160	161	162	163	44
45	140	142	143	145	146	147	149	150	152	153	154	156	157	158	160	161	162	163	165	166	167	45
46	143	145	146	148	149	151	152	154	155	156	158	159	160	162	163	164	166	167	168	170	171	46
47	146	148	150	151	152	154	155	157	158	160	161	163	164	165	167	168	169	171	172	173	175	47
48	150	151	153	154	156	157	159	160	162	163	165	166	167	169	170	172	173	174	176	177	178	48
49	153	154	156	157	159	160	162	164	165	167	168	169	171	172	174	175	177	178	179	181	182	49
50	156	157	160	161	162	164	165	167	168	170	171	173	174	176	177	179	180	182	183	184	186	50
51	159	161	162	164	165	167	169	170	172	173	175	176	178	179	181	182	184	185	187	188	189	51
52	162	164	165	167	169	170	172	174	175	177	178	180	131	183	184	186	187	189	190	192	193	52
53	165	167	169	170	172	174	175	177	178	180	182	183	185	186	188	189	191	192	194	195	197	53
54	168	170	172	173	175	177	179	180	182	184	185	187	188	190	191	193	195	196	198	199	201	54
55	171	173	175	177	178	180	182	184	185	187	189	190	192	193	195	197	198	200	201	203	204	55
56	174	176	178	180	182	183	185	187	189	190	192	194	195	197	199	200	202	203	205	206	208	56
57	178	180	181	183	185	187	188	190	192	194	195	197	199	200	202	204	265	207	209	210	212	57
58	181	183	184	186	188	190	192	194	195	197	199	200	202	204	206	207	269	211	212	214	215	58
59	184	186	188	190	191	193	195	197	199	201	202	204	206	207	209	211	213	214	216	218	219	59
60	187	189	190	193	195	196	198	200	202	204	206	207	209	211	213	214	216	219	219	221	223	60

Natural Versines.

'	50°	51°	52°	53°	54°	55°	56°	57°	58°	59°	'
0	0357212	0370680	0384338	0398185	0412215	0426424	0440807	0455361	0470081	0484962	0
1	0357435	0370906	0384568	0398417	0412450	0426662	0441048	0455605	0470327	0485211	1
2	57658	71132	84797	98650	12685	26900	41289	55849	70574	85461	2
3	57881	71358	85026	98882	12921	27139	41531	56093	70821	85710	3
4	0358104	0371584	0385256	0399115	0413156	0427377	0441772	0456337	0471068	0485960	4
5	58327	71811	85485	99347	13392	27616	42013	56581	71315	86209	5
6	58550	72037	85715	99580	13628	27854	42255	56826	71562	86459	6
7	0358774	0372263	0385944	0399812	0413863	0428093	0442496	0457070	0471809	0486708	7
8	58997	72490	86174	400045	14099	28331	42738	57314	72056	86958	8
9	59220	72716	86404	00278	14335	28570	42979	57558	72303	87208	9
10	0359443	0372943	0386633	0400511	0414571	0428809	0443221	0457803	0472550	0487457	10
11	59667	73169	86863	00743	14806	29048	43463	58047	72797	87707	11
12	59890	73396	87093	00976	15042	29286	43704	58292	73044	87957	12
13	0360114	0373623	0387323	0401209	0415278	0429525	0443946	0458536	0473291	0488207	13
14	60337	73850	87553	01442	15514	29764	44188	58781	73539	88457	14
15	60561	74076	87783	01675	15750	30003	44430	59025	73786	88707	15
16	0360785	0374303	0388013	0401908	0415986	0430242	0444672	0459270	0474033	0488957	16
17	61008	74530	88243	02142	16223	30481	44914	59515	74281	89207	17
18	61232	74757	88473	02375	16459	30720	45156	59760	74528	89457	18
19	0361456	0374984	0388703	0402608	0416695	0430960	0445398	0460004	0474776	0489707	19
20	61680	75211	88933	02841	16931	31199	45640	60249	75023	89957	20
21	61904	75439	89164	03075	17168	31438	45882	60494	75271	90208	21
22	0362128	0375666	0389394	0403308	0417404	0431677	0446124	0460739	0475519	0490458	22
23	62352	75893	89624	03542	17640	31917	46366	60984	75766	90706	23
24	62576	76120	89855	03775	17877	32156	46608	61229	76014	90959	24
25	0362800	0376348	0390085	0404009	0418114	0432396	0446851	0461474	0476262	0491209	25
26	63024	76575	90316	04242	18350	32635	47093	61719	76510	91459	26
27	63249	76803	90546	04476	18587	32875	47335	61965	76758	91710	27
28	0363473	0377030	0390777	0404710	0418823	0433114	0447578	0462210	0477005	0491960	28
29	63697	77258	91008	04943	19060	33354	47820	62455	77253	92211	29
30	63922	77485	91239	05177	19297	33594	48063	62700	77501	92462	30
31	0364146	0377713	0391469	0405411	0419534	0433833	0448306	0462946	0477749	0492712	31
32	64371	77941	91700	05645	19771	34073	48548	63191	77998	92963	32
33	64595	78169	91931	05879	20008	34313	48791	63437	78246	93214	33
34	0364820	0378396	0392162	0406113	0420245	0434553	0449034	0463682	0478494	0493464	34
35	65045	78624	92393	06347	20482	34793	49276	63928	78742	93715	35
36	65269	78852	92624	06581	20719	35033	49519	64173	78990	93966	36
37	0365494	0379080	0392855	0406815	0420956	0435273	0449762	0464419	0479239	0494217	37
38	65719	79308	93086	07049	21193	35513	50005	64664	79487	94468	38
39	65944	79536	93318	07284	21430	35753	50248	64910	79736	94719	39
40	0366169	0379764	0393549	0407518	0421668	0435993	0450491	0465156	0479984	0494970	40
41	66394	79993	93780	07752	21905	36234	50734	65402	80232	95221	41
42	66619	80221	94012	07987	22142	36474	50977	65648	80481	95472	42
43	0366844	0380449	0394243	0408221	0422380	0436714	0451220	0465893	0480729	0495723	43
44	67069	80678	94474	08456	22617	36955	51463	66139	80978	95975	44
45	67295	80906	94706	08690	22855	37195	51707	66385	81227	96226	45
46	0367520	0381134	0394938	0408925	0423092	0437435	0451950	0466631	0481475	0496477	46
47	67745	81363	95169	09160	23330	37676	52193	66878	81724	96729	47
48	67971	81592	95401	09394	23568	37917	52437	67124	81973	96980	48
49	0368196	0381820	0395633	0409629	0423805	0438157	0452680	0467370	0482222	0497231	49
50	68422	82049	95864	09864	24043	38398	52924	67616	82471	97483	50
51	68647	82278	96096	10099	24281	38639	53167	67862	82720	97734	51
52	0368873	0382506	0396328	0410334	0424519	0438879	0453411	0468109	0482969	0497986	52
53	69098	82735	96560	10569	24757	39120	53654	68355	83218	98238	53
54	69324	82964	96792	10804	24995	39361	53898	68601	83467	98489	54
55	0369550	0383193	0397024	0411039	0425233	0439602	0454142	0468848	0483716	0498741	55
56	69776	83422	97256	11274	25471	39843	54385	69094	83965	98993	56
57	70002	83651	97488	11509	25709	40084	54629	69341	84214	99244	57
58	0370228	0383880	0397720	0411744	0425947	0440325	0454873	0469587	0484463	0499496	58
59	70454	84109	97953	11979	26185	40566	55117	69834	84713	99748	59
60	70680	84338	98185	12215	26424	40807	55361	70081	84962	500000	60

Parts for Seconds.

	50°		51°		52°		53°		54°		55°		56°		57°		58°		59°		60°	
"	0′	30	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	"
1	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	1
2	7	7	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	2
3	11	11	11	11	11	12	12	12	12	12	12	12	12	12	12	12	12	12	12	13	13	3
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5	19	19	19	19	19	19	19	19	20	20	20	20	20	20	20	20	21	21	21	21	21	5
6	22	22	23	23	23	23	23	23	24	24	24	24	24	24	24	25	25	25	25	25	25	6
7	26	26	26	27	27	27	27	27	27	28	28	28	28	28	28	29	29	29	29	29	29	7
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9	33	34	34	34	34	35	35	35	35	36	36	36	36	36	37	37	37	37	37	38	38	9
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12	45	45	45	46	46	46	46	47	47	47	48	48	48	49	49	49	49	50	50	50	50	12
13	48	49	49	49	50	50	50	51	51	51	52	52	52	53	53	53	53	54	54	54	55	13
14	52	52	52	53	53	54	54	55	55	55	56	56	56	57	57	57	58	58	58	58	59	14
15	56	56	57	57	57	58	58	58	59	59	60	60	60	61	61	61	62	62	62	63	63	15
16	59	60	60	61	61	62	62	62	63	63	64	64	64	65	65	65	66	66	66	67	67	16
17	63	64	64	64	65	65	66	66	67	67	68	68	68	69	69	70	70	70	71	71	71	17
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19	71	71	72	72	73	73	74	74	75	75	75	76	76	77	77	78	78	79	79	79	80	19
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43	160	161	162	163	164	165	166	168	169	170	171	172	173	174	175	176	177	178	179	180	181	43
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47	175	176	177	178	180	181	182	183	184	185	187	188	189	190	191	192	193	194	195	196	197	47
48	178	180	181	182	183	185	186	187	188	190	191	192	193	194	195	196	197	198	199	201	202	48
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58	215	217	219	220	222	223	225	226	228	229	230	232	233	234	236	237	238	240	241	242	244	58
59	219	221	222	224	225	227	228	230	231	233	234	236	237	239	240	241	243	244	245	246	248	59
60	223	224	226	228	229	231	232	234	235	237	238	240	241	243	244	245	247	248	249	251	252	60

Natural Versines.

′	60°	61°	62°	63°	64°	65°	66°	67°	68°	69°	′
0	0500000	0515190	0530528	0546009	0561629	0577382	0593263	0609269	0625393	0641632	0
1	0500252	0515445	0530785	0546269	0561890	0577645	0593529	0609537	0625663	0641904	1
2	00504	15699	31042	46528	62152	77909	93795	09804	25933	42175	2
3	00756	15954	31299	46787	62413	78173	94061	10072	26203	42447	3
4	0501008	0516208	0531556	0547046	0562675	0578437	0594327	0610340	0626472	0642719	4
5	01260	16463	31813	47306	62937	78700	94592	10608	26742	42990	5
6	01512	16718	32070	47565	63198	78964	94858	10876	27012	43262	6
7	0501764	0516972	0532327	0547825	0563460	0579228	0595124	0611144	0627282	0643534	7
8	02017	17227	32584	48084	63722	79492	95390	11412	27552	43806	8
9	02269	17482	32842	48344	63983	79756	95656	11680	27822	44077	9
10	0502521	0517737	0533099	0548603	0564245	0580020	0595922	0611948	0628092	0644349	10
11	02774	17991	33356	48863	64507	80284	96189	12216	28362	44621	11
12	03026	18246	33613	49122	64769	80548	96455	12484	28632	44893	12
13	0503278	0518501	0533871	0549382	0565031	0580812	0596721	0612753	0628902	0645165	13
14	03531	18756	34128	49642	65293	81076	96987	13021	29172	45437	14
15	03783	19011	34385	49902	65555	81340	97253	13289	29443	45709	15
16	0504036	0519266	0534643	0550161	0565817	0581604	0597520	0613557	0629713	0645981	16
17	04289	19521	34900	50421	66079	81869	97786	13826	29983	46253	17
18	04541	19776	35158	50681	66341	82133	98052	14094	30253	46525	18
19	0504794	0520032	0535415	0550941	0566603	0582397	0598319	0614362	0630523	0646797	19
20	05047	20287	35673	51201	66865	82661	98585	14631	30794	47069	20
21	05299	20542	35931	51461	67127	82926	98851	14899	31064	47342	21
22	0505552	0520797	0536188	0551721	0567390	0583190	0599118	0615168	0631335	0647614	22
23	05805	21053	36446	51981	67652	83455	99384	15436	31605	47886	23
24	06058	21308	36704	52241	67914	83719	99651	15705	31875	48158	24
25	0506311	0521564	0536962	0552501	0568177	0583984	0599917	0615973	0632146	0648431	25
26	06564	21819	37220	52761	68439	84248	600184	16242	32416	48703	26
27	06817	22074	37477	53021	68701	84513	00451	16510	32687	48975	27
28	0507070	0522330	0537735	0553282	0568964	0584777	0600717	0616779	0632957	0649248	28
29	07323	22586	37993	53542	69226	85042	00984	17048	33228	49520	29
30	07576	22841	38251	53802	69489	85307	01251	17317	33499	49793	30
31	0507830	0523097	0538509	0554062	0569751	0585571	0601518	0617585	0633769	0650065	31
32	08083	23353	38767	54323	70014	85836	01784	17854	34040	50338	32
33	08336	23608	39026	54583	70277	86101	02051	18123	34311	50610	33
34	0508589	0523864	0539284	0554844	0570539	0586366	0602318	0618392	0634582	0650883	34
35	08843	24120	39542	55104	70802	86631	02585	18661	34852	51155	35
36	09096	24376	39800	55365	71065	86896	02852	18930	35123	51428	36
37	0509350	0524632	0540058	0555625	0571328	0587160	0603119	0619199	0635394	0651701	37
38	09603	24888	40317	55886	71590	87425	03386	19468	35665	51973	38
39	09857	25144	40575	56147	71853	87690	03653	19737	35936	52246	39
40	0510110	0525400	0540833	0556407	0572116	0587955	0603920	0620006	0636207	0652519	40
41	10364	25656	41092	56668	72379	88220	04187	20275	36478	52791	41
42	10617	25912	41350	56929	72642	88486	04454	20544	36749	53064	42
43	0510871	0526168	0541609	0557190	0572905	0588751	0604722	0620813	0637020	0653337	43
44	11125	26424	41867	57450	73168	89016	04989	21082	37291	53610	44
45	11379	26680	42126	57711	73431	89281	05256	21351	37562	53883	45
46	0511633	0526937	0542385	0557972	0573694	0589546	0605523	0621621	0637833	0654156	46
47	11886	27193	42643	58233	73957	89812	05791	21890	38104	54429	47
48	12140	27449	42902	58494	74221	90077	06058	22159	38375	54702	48
49	0512394	0527706	0543161	0558755	0574484	0590342	0606325	0622429	0638647	0654975	49
50	12648	27962	43420	59016	74747	90608	06593	22698	38918	55248	50
51	12902	28218	43678	59277	75010	90873	06860	22967	39189	55521	51
52	0513156	0528475	0543937	0559538	0575274	0591138	0607128	0623237	0639460	0655794	52
53	13410	28731	44196	59800	75537	91404	07395	23506	39732	56067	53
54	13665	28988	44455	60061	75801	91669	07663	23776	40003	56340	54
55	0513919	0529245	0544714	0560322	0576064	0591935	0607930	0624045	0640275	0656613	55
56	14173	29501	44973	60583	76327	92201	08198	24315	40546	56887	56
57	14427	29758	45232	60845	76591	92466	08466	24584	40817	57160	57
58	0514682	0530015	0545491	0561106	0576854	0592732	0608733	0624854	0641089	0657433	58
59	14936	30272	45750	61367	77118	92998	09001	25124	41360	57706	59
60	15190	30528	46009	61629	77382	93263	09269	25393	41632	57980	60

Parts for Seconds.

"	60°		61°		62°		63°		64°		65°		66°		67°		68°		69°		70°	
	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	"
1	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	5	5	5	5	5	5	1
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3	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	14	14	14	14	3
4	17	17	17	17	17	17	17	17	17	18	18	18	18	18	18	18	18	18	18	18	18	4
5	21	21	21	21	21	21	22	22	22	22	22	22	22	22	22	22	22	23	23	23	23	5
6	25	25	25	26	26	26	26	26	26	26	26	26	27	27	27	27	27	27	27	27	27	6
7	29	30	30	30	30	30	30	30	31	31	31	31	31	31	31	31	31	32	32	32	32	7
8	34	34	34	34	34	34	35	35	35	35	35	35	35	36	36	36	36	36	36	36	36	8
9	38	38	38	38	39	39	39	39	39	39	40	40	40	40	40	40	40	41	41	41	41	9
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11	46	46	47	47	47	47	48	48	48	48	48	49	49	49	49	49	49	50	50	50	50	11
12	50	51	51	51	51	52	52	52	52	53	53	53	53	53	53	54	54	54	54	54	55	12
13	55	55	55	55	56	56	56	56	57	57	57	57	58	58	58	58	58	59	59	59	59	13
14	59	59	59	60	60	60	60	61	61	61	62	62	62	62	62	63	63	63	63	64	64	14
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17	71	72	72	72	73	73	73	74	74	74	75	75	75	76	76	76	76	77	77	77	77	17
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25	105	105	106	107	107	107	108	108	109	109	110	110	111	111	112	112	112	113	113	114	114	25
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51	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	228	229	230	231	232	232	51
52	218	219	220	221	223	224	225	226	227	228	228	229	230	231	232	233	234	235	235	236	237	52
53	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	237	238	239	240	241	241	53
54	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	244	245	246	54
55	231	232	233	234	235	236	238	239	240	241	242	243	244	245	245	246	247	248	249	250	251	55
56	235	236	237	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	253	254	255	56
57	239	240	242	243	244	245	246	247	249	249	250	251	252	253	254	255	256	257	258	259	260	57
58	244	245	246	247	248	249	251	252	253	254	255	256	257	258	259	260	261	262	262	263	264	58
59	248	249	250	251	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	59
60	252	253	254	256	257	258	259	260	261	263	264	265	266	267	268	269	270	271	272	272	273	60

Natural Versines.

′	70°	71°	72°	73°	74°	75°	76°	77°	78°	79°	′
0	0657980	0674432	0690983	0707628	0724363	0741181	0758078	0775049	0792088	0809191	0
1	0658253	0674707	0691260	0707906	0724642	0741462	0758360	0775332	0792373	0809477	1
2	58527	74982	91536	08185	24922	41743	58643	75616	92657	09762	2
3	58800	75257	91813	08463	25202	42024	58925	75899	92942	10048	3
4	0659073	0675532	0692090	0708741	0725481	0742305	0759207	0776183	0793227	0810333	4
5	59347	75807	92367	09019	25761	42586	59490	76466	93511	10619	5
6	59620	76083	92643	09296	26041	42867	59772	76750	93796	10905	6
7	0659894	0676358	0692920	0709576	0726321	0743148	0760054	0777033	0794080	0811190	7
8	60167	76633	93197	09854	26600	43429	60337	77317	94365	11476	8
9	60441	76908	93474	10133	26880	43711	60619	77601	94650	11761	9
10	0660715	0677184	0693751	0710411	0727160	0743992	0760902	0777884	0794934	0812047	10
11	60988	77459	94028	10690	27440	44273	61184	78168	95219	12333	11
12	61262	77734	94305	10968	27720	44554	61466	78451	95504	12619	12
13	0661536	0678010	0694582	0711247	0728000	0744835	0761749	0778735	0795789	0812904	13
14	61809	78285	94859	11525	28280	45117	62032	79019	96073	13190	14
15	62083	78560	95136	11804	28560	45398	62314	79303	96358	13476	15
16	0662357	0678836	0695413	0712082	0728839	0745679	0762597	0779586	0796643	0813762	16
17	62631	79111	95690	12361	29119	45961	62879	79870	96928	14048	17
18	62905	79387	95967	12639	29400	46242	63162	80154	97213	14333	18
19	0663179	0679663	0696244	0712918	0729680	0746523	0763444	0780438	0797498	0814619	19
20	63452	79938	96521	13197	29960	46805	63727	80721	97782	14905	20
21	63726	80214	96798	13475	30240	47086	64010	81005	98067	15191	21
22	0664000	0680489	0697076	0713754	0730520	0747368	0764292	0781289	0798352	0815477	22
23	64274	80765	97353	14033	30800	47649	64575	81573	98637	15763	23
24	64548	81041	97630	14312	31080	47931	64858	81857	98922	16049	24
25	0664822	0681316	0697907	0714590	0731360	0748212	0765141	0782141	0799207	0816335	25
26	65097	81592	98185	14869	31641	48494	65423	82425	99492	16620	26
27	65371	81868	98462	15148	31921	48775	65706	82708	99777	16906	27
28	0665645	0682144	0698739	0715427	0732201	0749057	0765989	0782992	0800062	0817192	28
29	65919	82419	99017	15706	32481	49338	66272	83276	00347	17478	29
30	66193	82695	99294	15985	32762	49620	66555	83560	00632	17764	30
31	0666467	0682971	0699572	0716264	0733042	0749902	0766837	0783844	0800917	0818050	31
32	66742	83247	99849	16542	33322	50183	67120	84128	01202	18336	32
33	67016	83523	700127	16821	33603	50465	67403	84412	01487	18623	33
34	0667290	0683799	0700404	0717100	0733883	0750747	0767686	0784696	0801772	0818909	34
35	67564	84075	00682	17379	34163	51028	67969	84981	02057	19195	35
36	67839	84351	00959	17658	34444	51310	68252	85265	02343	19481	36
37	0668113	0684627	0701237	0717938	0734724	0751592	0768535	0785549	0802628	0819767	37
38	68388	84903	01514	18217	35005	51874	68818	85833	02913	20053	38
39	68662	85179	01792	18496	35285	52155	69101	86117	03198	20339	39
40	0668937	0685455	0702070	0718775	0735566	0752437	0769384	0786401	0803483	0820625	40
41	69211	85731	02347	19054	35846	52719	69667	86685	03769	20912	41
42	69486	86007	02625	19333	36127	53001	69950	86970	04054	21198	42
43	0669760	0686284	0702903	0719612	0736407	0753283	0770233	0787254	0804339	0821484	43
44	70035	86560	03181	19892	36688	53565	70516	87538	04624	21770	44
45	70309	86836	03458	20171	36969	53847	70800	87822	04910	22056	45
46	0670584	0687112	0703736	0720450	0737249	0754129	0771083	0788107	0805195	0822343	46
47	70859	87389	04014	20730	37530	54411	71366	88391	05480	22629	47
48	71133	87665	04292	21009	37811	54693	71649	88675	05766	22915	48
49	0671408	0687941	0704570	0721288	0738091	0754975	0771932	0788959	0806051	0823202	49
50	71683	88218	04848	21568	38372	55257	72216	89244	06336	23488	50
51	71958	88494	05126	21847	38653	55539	72499	89528	06622	23774	51
52	0672232	0688771	0705404	0722126	0738934	0755821	0772782	0789813	0806907	0824060	52
53	72507	89047	05682	22406	39215	56103	73065	90097	07193	24347	53
54	72782	89324	05960	22685	39495	56385	73349	90381	07478	24633	54
55	0673057	0689600	0706238	0722965	0739776	0756667	0773632	0790666	0807763	0824920	55
56	73332	89877	06516	23244	40057	56949	73915	90950	08049	25206	56
57	73607	90153	06794	23524	40338	57231	74199	91235	08334	25492	57
58	0673882	0690430	0707072	0723803	0740619	0757514	0774482	0791519	0808620	0825779	58
59	74157	90706	07350	24083	40900	57796	74765	91804	08905	26065	59
60	74432	90983	07628	24363	41181	58078	75049	92088	09191	26352	60

Parts for Seconds.

	70°		71°		72°		73°		74°		75°		76°		77°		78°		79°		80°	
"	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	"
1	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	1
2	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	10	10	10	10	2
3	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	3
4	18	18	18	18	18	18	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	4
5	23	23	23	23	23	23	23	23	23	23	23	23	24	24	24	24	24	24	24	24	24	5
6	27	27	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	29	29	39	29	6
7	32	32	32	32	32	32	32	33	33	33	33	33	33	33	33	33	33	33	33	33	33	7
8	36	37	37	37	37	37	37	37	37	37	37	38	38	38	38	38	38	38	38	38	38	8
9	41	41	41	41	41	42	42	42	42	42	42	42	42	42	43	43	43	43	43	43	43	9
10	46	46	46	46	46	46	46	46	47	47	47	47	47	47	47	47	47	48	48	48	48	10
11	50	50	50	51	51	51	51	51	51	51	52	52	52	52	52	52	52	52	52	52	53	11
12	55	55	55	55	55	55	56	56	56	56	56	56	56	57	57	57	57	57	57	57	57	12
13	59	59	60	60	60	60	60	60	61	61	61	61	61	61	61	62	62	62	62	62	62	13
14	64	64	64	64	65	65	65	65	65	65	66	66	66	66	66	66	66	67	67	67	67	14
15	68	69	69	69	69	69	70	70	70	70	70	70	71	71	71	71	71	71	71	71	72	15
16	73	73	73	74	74	74	74	74	75	75	75	75	75	75	76	76	76	76	76	76	76	16
17	77	78	78	78	78	79	79	79	79	79	80	80	80	80	80	80	81	81	81	81	81	17
18	82	82	83	83	83	83	83	84	84	84	84	84	85	85	85	85	85	86	86	86	86	18
19	87	87	87	87	88	88	88	88	89	89	89	89	89	90	90	90	90	90	90	91	91	19
20	91	91	92	92	92	92	93	93	93	93	94	94	94	94	94	95	95	95	95	95	95	20
21	96	96	96	97	97	97	97	98	98	98	98	99	99	99	99	99	100	100	100	100	100	21
22	100	101	101	101	101	102	102	102	103	103	103	103	103	104	104	104	104	105	105	105	105	22
23	105	105	105	106	106	106	107	107	107	107	108	108	108	108	109	109	109	109	109	110	110	23
24	109	110	110	110	111	111	111	112	112	112	112	113	113	113	113	114	114	114	114	114	115	24
25	114	114	115	115	115	116	116	116	117	117	117	117	118	118	118	118	119	119	119	119	119	25
26	118	119	119	120	120	120	121	121	121	121	122	122	122	123	123	123	123	124	124	124	124	26
27	123	123	124	124	124	125	125	125	126	126	126	127	127	127	128	128	128	128	128	129	129	27
28	128	128	128	129	129	129	130	130	131	131	131	131	132	132	132	133	133	133	133	133	134	28
29	132	133	133	133	134	134	134	135	135	135	136	136	136	137	137	137	138	138	138	138	138	29
30	137	137	138	138	138	139	139	139	140	140	140	141	141	141	142	142	142	143	143	143	143	30
31	141	142	142	143	143	143	144	144	144	145	145	145	146	146	146	147	147	147	148	148	148	31
32	146	146	147	147	148	148	148	149	149	149	150	150	151	151	151	152	152	152	152	152	153	32
33	150	151	151	152	152	153	153	153	154	154	154	155	155	156	156	156	156	157	157	157	158	33
34	155	155	156	156	157	157	158	158	158	159	159	160	160	160	161	161	161	162	162	162	162	34
35	159	160	160	161	161	162	162	163	163	164	164	164	165	165	165	166	166	166	167	167	167	35
36	164	165	165	166	166	166	167	167	168	168	169	169	169	170	170	170	171	171	171	172	172	36
37	169	169	170	170	171	171	172	172	172	173	173	174	174	174	175	175	175	176	176	176	177	37
38	173	174	174	175	175	176	176	177	177	178	178	178	179	179	180	180	181	181	181	181	181	38
39	178	178	179	179	180	180	181	181	182	182	183	183	183	184	184	185	185	185	186	186	186	39
40	182	183	183	184	184	185	185	186	186	187	187	188	188	189	189	189	190	190	190	191	191	40
41	187	187	188	188	189	190	190	191	191	192	192	192	193	193	194	194	194	195	195	195	196	41
42	191	192	193	193	194	194	195	195	196	196	197	197	198	198	198	199	199	200	200	200	201	42
43	196	197	197	198	198	199	199	200	200	201	201	202	202	202	203	204	204	204	205	205	205	43
44	200	201	202	202	203	203	204	205	205	206	206	207	207	207	208	208	209	209	209	210	210	44
45	205	206	206	207	207	208	209	209	210	210	211	211	212	212	213	213	213	214	214	214	215	45
46	210	210	211	211	212	213	213	214	214	215	215	216	216	217	217	218	218	219	219	219	220	46
47	214	215	215	216	217	217	218	218	219	220	220	221	221	222	222	222	223	223	224	224	224	47
48	219	219	220	221	221	222	223	223	224	224	225	225	226	226	227	227	228	228	228	229	229	48
49	223	224	225	225	226	227	228	228	228	229	229	230	231	231	231	232	232	233	233	234	234	49
50	228	229	229	230	231	231	232	232	233	234	234	235	235	236	236	237	237	238	238	238	239	50
51	232	233	234	234	235	236	236	237	238	238	239	239	240	240	241	241	242	242	243	243	243	51
52	237	238	238	239	240	240	241	242	242	243	243	244	245	245	246	246	247	247	247	248	248	52
53	241	242	243	244	244	245	246	246	247	248	248	249	249	250	250	251	251	252	252	253	253	53
54	246	247	248	248	249	250	250	251	252	252	253	253	254	255	255	256	256	257	257	257	258	54
55	251	251	252	253	254	254	255	256	256	257	258	258	259	259	260	260	261	261	262	262	263	55
56	255	256	257	257	258	259	260	260	261	262	262	263	263	264	265	265	266	266	267	267	267	56
57	260	261	261	262	263	264	264	265	266	266	267	268	268	269	270	270	270	271	271	272	272	57
58	264	265	266	267	267	268	269	270	270	271	272	272	273	273	274	275	275	276	276	276	277	58
59	269	270	270	271	272	273	274	274	275	276	276	277	277	278	279	279	280	280	281	281	282	59
60	273	274	275	276	277	277	278	279	280	280	281	282	282	283	283	284	284	285	286	286	286	60

Natural Versines.

	80°	81°	82°	83°	84°	85°	86°	87°	88°	89°	
0	0826352	0843665	0860827	0878131	0895471	0912844	0930243	0947664	0965100	0982548	0
1	0826638	0843853	0861115	0878419	0895761	0913134	0930534	0947954	0965391	0982838	1
2	26925	44140	61403	78708	96050	13424	30824	48245	65682	83129	2
3	27211	44427	61691	78997	96339	13714	31114	48535	65973	83420	3
4	0827498	0844715	0861979	0879286	0896629	0914003	0931404	0948826	0966263	0983711	4
5	27784	45002	62267	79574	96918	14293	31694	49116	66554	84002	5
6	28071	45290	62555	79863	97207	14583	31985	49407	66845	84293	6
7	0828357	0845577	0862844	0880152	0897497	0914873	0932275	0949698	0967136	0984583	7
8	28644	45864	63132	80441	97786	15163	32565	49988	67426	84874	8
9	28931	46152	63420	80730	98075	15453	32855	50279	67717	85165	9
10	0829217	0846439	0863708	0881018	0898365	0915742	0933146	0950569	0968008	0985456	10
11	29504	46727	63996	81307	98654	16032	33436	50860	68298	85747	11
12	29790	47014	64284	81596	98944	16322	33726	51150	68589	86038	12
13	0830077	0847302	0864573	0881885	0899233	0916612	0934016	0951441	0968880	0986329	13
14	30364	47589	64861	82174	99522	16902	34307	51731	69171	86619	14
15	30650	47877	65149	82463	99812	17192	34597	52022	69461	86910	15
16	0830937	0848164	0865437	0882751	0900101	0917482	0934887	0952312	0969752	0987201	16
17	31224	48452	65726	83040	00391	17772	35177	52603	70043	87492	17
18	31511	48739	66014	83329	00680	18061	35468	52893	70334	87783	18
19	0831797	0849027	0866302	0883618	0900970	0918351	0935758	0953184	0970624	0988074	19
20	32084	49314	66590	83907	01259	18641	36048	53475	70915	88365	20
21	32371	49602	66879	84196	01549	18931	36339	53765	71206	88656	21
22	0832658	0849889	0867167	0884485	0901838	0919221	0936629	0954056	0971497	0988946	22
23	32944	50177	67455	84774	02128	19511	36919	54346	71788	89237	23
24	33231	50465	67744	85063	02417	19801	37209	54637	72078	89528	24
25	0833518	0850752	0868032	0885352	0902707	0920091	0937500	0954928	0972369	0989819	25
26	33805	51040	68320	85641	02996	20381	37790	55218	72660	90110	26
27	34092	51328	68609	85930	03286	20671	38080	55509	72951	90401	27
28	0834379	0851615	0868897	0886219	0903575	0920961	0938371	0955799	0973241	0990692	28
29	34665	51903	69185	86508	03865	21251	38661	56090	73532	90983	29
30	34952	52191	69474	86797	04154	21541	38951	56381	73823	91273	30
31	0835239	0852478	0869762	0887086	0904444	0921831	0939242	0956671	0974114	0991564	31
32	35526	52766	70051	87375	04733	22121	39532	56962	74405	91855	32
33	35813	53054	70339	87664	05023	22411	39822	57252	74695	92146	33
34	0836100	0853341	0870627	0887953	0905312	0922701	0940113	0957543	0974986	0992437	34
35	36387	53629	70916	88242	05602	22991	40403	57834	75277	92728	35
36	36674	53917	71204	88531	05892	23281	40694	58124	75568	93019	36
37	0836961	0854205	0871493	0888820	0906181	0923571	0940984	0958415	0975859	0993310	37
38	37248	54492	71781	89109	06471	23861	41274	58706	76149	93600	38
39	37535	54780	72070	89398	06760	24151	41565	58996	76440	93891	39
40	0837822	0855068	0872358	0889687	0907050	0924441	0941855	0959287	0976731	0994182	40
41	38109	55356	72647	89977	07340	24731	42146	59578	77022	94473	41
42	38396	55644	72935	90266	07629	25021	42436	59868	77313	94764	42
43	0838683	0855932	0873224	0890555	0907919	0925311	0942726	0960159	0977603	0995056	43
44	38970	56219	73512	90844	08209	25601	43017	60449	77894	95346	44
45	39257	56507	73801	91133	08498	25891	43307	60740	78185	95637	45
46	0839544	0856795	0874090	0891422	0908788	0926182	0943598	0961031	0978476	0995928	46
47	39832	57083	74378	91711	09078	26472	43888	61321	78767	96218	47
48	40119	57371	74667	92001	09367	26762	44178	61612	79058	96509	48
49	0840406	0857659	0874955	0892290	0909657	0927052	0944469	0961903	0979348	0996800	49
50	40693	57947	75244	92579	09947	27342	44759	62193	79639	97091	50
51	40980	58235	75533	92868	10236	27632	45050	62484	79930	97382	51
52	0841267	0858523	0875821	0893157	0910526	0927922	0945340	0962775	0980221	0997673	52
53	41555	58811	76110	93447	10816	28212	45631	63066	80512	97964	53
54	41842	59099	76398	93736	11106	28503	45921	63356	80803	98255	54
55	0842129	0859387	0876687	0894025	0911395	0928793	0946212	0963647	0981093	0998546	55
56	42416	59675	76976	94314	11685	29083	46502	63938	81384	98836	56
57	42704	59963	77264	94604	11975	29373	46793	64228	81675	99127	57
58	0842991	0860251	0877553	0894893	0912265	0929663	0947083	0964519	0981966	0999418	58
59	43278	60539	77842	95182	12554	29953	47374	64810	82257	99709	59
60	43565	60827	78131	95471	12844	30243	47664	65100	82548	1000000	60

Parts for Seconds.

	80°		81°		82°		83°		84°		85°		86°		87°		88°		89°		90°	
"	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	"
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Natural Versines.

′	90°	91°	92°	93°	94°	95°	96°	97°	98°	99°	′
0	1000000	1017452	1034900	1052336	1069757	1087156	1104529	1121869	1139173	1156435	0
1	1000291	1017743	1035190	1052626	1070047	1087446	1104818	1122158	1139461	1156722	1
2	00582	18034	35481	52917	70337	87735	05107	22447	39749	57009	2
3	00873	18325	35772	53207	70627	88025	05396	22736	40037	57296	3
4	1001164	1018616	1036062	1053498	1070917	1088315	1105686	1123024	1140325	1157584	4
5	01454	18907	36353	53788	71207	88605	05975	23313	40613	57871	5
6	01745	19197	36644	54079	71497	88894	06264	23602	40901	58158	6
7	1002036	1019488	1036934	1054369	1071788	1089184	1106553	1123890	1141189	1158445	7
8	02327	19779	37225	54660	72078	89474	06843	24179	41477	58733	8
9	02618	20070	37516	54950	72368	89764	07132	24467	41765	59020	9
10	1002909	1020361	1037807	1055241	1072658	1090053	1107421	1124756	1142053	1159307	10
11	03200	20652	38097	55531	72948	90343	07710	25045	42341	59594	11
12	03491	20942	38388	55822	73238	90633	07999	25333	42629	59881	12
13	1003781	1021233	1038679	1056112	1073528	1090922	1108289	1125622	1142917	1160168	13
14	04072	21524	38969	56402	73818	91212	08578	25910	43205	60456	14
15	04363	21815	39260	56693	74109	91502	08867	26199	43493	60743	15
16	1004654	1022106	1039551	1056983	1074399	1091791	1109156	1126488	1143781	1161030	16
17	04945	22397	39841	57274	74689	92081	09445	26776	44068	61317	17
18	05236	22687	40132	57564	74979	92371	09734	27065	44356	61604	18
19	1005527	1022978	1040422	1057854	1075269	1092660	1110023	1127353	1144644	1161891	19
20	05818	23269	40713	58145	75559	92950	10313	27642	44932	62178	20
21	06109	23560	41004	58435	75849	93240	10602	27930	45220	62465	21
22	1006400	1023851	1041294	1058726	1076139	1093529	1110891	1128219	1145508	1162752	22
23	06690	24141	41585	59016	76429	93819	11180	28507	45795	63039	23
24	06981	24432	41876	59306	76719	94108	11469	28796	46083	63326	24
25	1007272	1024723	1042166	1059597	1077009	1094398	1111758	1129084	1146371	1163613	25
26	07563	25014	42457	59887	77299	94688	12047	29373	46659	63900	26
27	07854	25305	42748	60178	77589	94977	12336	29661	46946	64187	27
28	1008145	1025595	1043038	1060468	1077879	1095267	1112625	1129949	1147234	1164474	28
29	08436	25886	43329	60758	78169	95556	12914	30238	47522	64761	29
30	08727	26177	43619	61049	78459	95846	13203	30526	47809	65048	30
31	1009017	1026468	1043910	1061339	1078749	1096135	1113492	1130815	1148097	1165335	31
32	09308	26759	44201	61629	79039	96425	13781	31103	48385	65621	32
33	09599	27049	44491	61920	79329	96714	14070	31391	48672	65908	33
34	1009890	1027340	1044782	1062210	1079619	1097004	1114359	1131680	1148960	1166195	34
35	10181	27631	45072	62500	79909	97293	14648	31968	49248	66482	35
36	10472	27922	45363	62791	80199	97583	14937	32256	49536	66769	36
37	1010763	1028212	1045654	1063081	1080489	1097872	1115226	1132545	1149823	1167056	37
38	11054	28503	45944	63371	80779	98162	15515	32833	50111	67342	38
39	11344	28794	46235	63661	81069	98451	15804	33121	50398	67629	39
40	1011635	1029085	1046525	1063952	1081359	1098741	1116093	1133410	1150686	1167916	40
41	11926	29376	46816	64242	81649	99030	16382	33698	50973	68203	41
42	12217	29666	47107	64532	81939	99320	16671	33986	51261	68489	42
43	1012508	1029957	1047397	1064823	1082228	1099609	1116960	1134274	1151548	1168776	43
44	12799	30248	47688	65113	82518	99899	17249	34563	51836	69063	44
45	13090	30539	47978	65403	82808	1100188	17537	34851	52123	69350	45
46	1013381	1030829	1048269	1065693	1083098	1100478	1117826	1135139	1152411	1169636	46
47	13671	31120	48559	65984	83388	00767	18115	35427	52698	69923	47
48	13962	31411	48850	66274	83678	01056	18404	35716	52986	70210	48
49	1014253	1031702	1049140	1066564	1083968	1101346	1118693	1136004	1153273	1170496	49
50	14544	31992	49431	66854	84258	01635	18982	36292	53561	70783	50
51	14835	32283	49721	67145	84547	01925	19270	36580	53848	71069	51
52	1015126	1032574	1050012	1067435	1084837	1102214	1119559	1136868	1154136	1171356	52
53	15417	32864	50302	67725	85127	02503	19848	37156	54423	71643	53
54	15707	33155	50593	68015	85417	02793	20137	37445	54710	71929	54
55	1015998	1033446	1050884	1068306	1085707	1103082	1120426	1137733	1154998	1172216	55
56	16289	33737	51174	68596	85997	03371	20714	38021	55285	72502	56
57	16580	34027	51465	68886	86286	03661	21003	38309	55573	72789	57
58	1016871	1034318	1051755	1069176	1086576	1103950	1121292	1138597	1155860	1173075	58
59	17162	34609	52046	69466	86866	04239	21581	38885	56147	73362	59
60	17452	34900	52336	69757	87156	04529	21869	39173	56435	73648	60

Parts for Seconds.

	90°		91°		92°		93°		94°		95°		96°		97°		98°		99°		100°	
"	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	"
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53	257	257	257	257	257	257	257	256	256	256	256	256	256	255	255	255	254	254	254	253	253	53
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55	267	267	267	267	266	266	266	266	266	266	266	265	265	265	265	264	264	264	263	263	263	55
56	272	271	271	271	271	271	271	271	271	271	270	270	270	270	269	269	269	269	268	268	267	56
57	276	276	276	276	276	276	276	276	276	275	275	275	275	275	274	274	274	273	273	273	272	57
58	281	281	281	281	281	281	281	281	280	280	280	280	280	279	279	279	278	278	278	277	277	58
59	286	286	286	286	286	286	286	286	285	285	285	285	284	284	284	284	283	283	283	282	282	59
60	291	291	291	291	291	290	290	290	290	290	290	290	289	289	289	288	288	288	287	287	286	60

Natural Versines.

′	100°	101°	102°	103°	104°	105°	106°	107°	108°	109°	′
0	1173648	1190509	1207912	1224951	1241922	1258819	1275637	1292372	1309017	1325568	0
1	1173935	1191095	1208196	1225235	1242204	1259100	1275917	1292650	1309294	1325843	1
2	74221	91380	08481	25518	42486	59381	76197	92928	09570	26118	2
3	74508	91666	08765	25801	42769	59662	76476	93206	09847	26393	3
4	1174794	1191951	1209050	1226085	1243051	1259943	1276756	1293484	1310123	1326668	4
5	75080	92237	09334	26368	43333	60224	77035	93762	10400	26943	5
6	75367	92522	09619	26651	43615	60505	77315	94040	10676	27218	6
7	1175653	1192807	1209903	1226935	1243897	1260785	1277594	1294318	1310953	1327493	7
8	75940	93093	10187	27218	44179	61066	77874	94596	11229	27768	8
9	76226	93378	10472	27501	44461	61347	78153	94874	11506	28042	9
10	1176512	1193664	1210756	1227784	1244743	1261628	1278432	1295152	1311782	1328317	10
11	76798	93949	11041	28068	45025	61909	78712	95430	12059	28592	11
12	77085	94234	11325	28351	45307	62189	78991	95708	12335	28867	12
13	1177371	1194520	1211609	1228634	1245589	1262470	1279270	1295986	1312611	1329141	13
14	77657	94805	11893	28917	45871	62751	79550	96264	12888	29416	14
15	77944	95090	12178	29200	46153	63031	79829	96542	13164	29691	15
16	1178230	1195376	1212462	1229484	1246435	1263312	1280108	1296819	1313440	1329965	16
17	78516	95661	12746	29767	46717	63593	80388	97097	13716	30240	17
18	78802	95946	13030	30050	46999	63873	80667	97375	13993	30514	18
19	1179088	1196231	1213315	1230333	1247281	1264154	1280946	1297653	1314269	1330789	19
20	79375	96517	13599	30616	47563	64434	81225	97930	14545	31063	20
21	79661	96802	13883	30899	47845	64715	81504	98208	14821	31338	21
22	1179947	1197087	1214167	1231182	1248126	1264995	1281783	1298486	1315097	1331612	22
23	80233	97372	14451	31465	48408	65276	82062	98763	15373	31887	23
24	80519	97657	14735	31748	48690	65556	82342	99041	15649	32161	24
25	1180805	1197943	1215019	1232031	1248972	1265837	1282621	1299318	1315925	1332436	25
26	81091	98228	15304	32314	49253	66117	82900	99596	16201	32710	26
27	81377	98513	15588	32597	49535	66397	83179	99873	16477	32984	27
28	1181664	1198798	1215872	1232880	1249817	1266678	1283458	1300151	1316753	1333258	28
29	81950	99083	16156	33163	50098	66958	83736	00428	17029	33533	29
30	82236	99368	16440	33445	50380	67238	84015	00706	17305	33807	30
31	1182522	1199653	1216724	1233728	1250662	1267519	1284294	1300983	1317581	1334081	31
32	82808	99938	17008	34011	50943	67799	84573	01261	17856	34355	32
33	83094	1200223	17292	34294	51225	68079	84852	01538	18132	34629	33
34	1183380	1200508	1217575	1234577	1251506	1268359	1285131	1301815	1318408	1334903	34
35	83665	00793	17859	34859	51788	68640	85410	02093	18684	35178	35
36	83951	01078	18143	35142	52069	68920	85688	02370	18959	35452	36
37	1184237	1201363	1218427	1235425	1252351	1269200	1285967	1302647	1319235	1335726	37
38	84523	01648	18711	35708	52632	69480	86246	02924	19511	36000	38
39	84809	01933	18995	35990	52914	69760	86525	03202	19786	36274	39
40	1185095	1202218	1219279	1236273	1253195	1270040	1286803	1303479	1320062	1336548	40
41	85381	02502	19562	36556	53477	70320	87082	03756	20337	36821	41
42	85667	02787	19846	36838	53758	70600	87361	04033	20613	37095	42
43	1185952	1203072	1220130	1237121	1254039	1270881	1287639	1304310	1320889	1337369	43
44	86238	03357	20414	37403	54321	71161	87918	04587	21164	37643	44
45	86524	03642	20697	37686	54602	71440	88196	04864	21440	37917	45
46	1186810	1203927	1220981	1237968	1254883	1271720	1288475	1305141	1321715	1338191	46
47	87096	04211	21265	38251	55165	72000	88753	05418	21990	38464	47
48	87381	04496	21549	38534	55446	72280	89032	05695	22266	38738	48
49	1187667	1204781	1221832	1238816	1255727	1272560	1289310	1305972	1322541	1339012	49
50	87953	05066	22116	39098	56008	72840	89589	06249	22816	39285	50
51	88239	05350	22399	39381	56289	73120	89867	06526	23092	39559	51
52	1188524	1205635	1222683	1239663	1256571	1273400	1290146	1306803	1323367	1339833	52
53	88810	05920	22967	39946	56852	73679	90424	07080	23642	40106	53
54	89095	06204	23250	40228	57133	73959	90702	07357	23917	40380	54
55	1189381	1206489	1223534	1240510	1257414	1274239	1290981	1307633	1324193	1340653	55
56	89667	06773	23817	40793	57695	74519	91259	07910	24468	40927	56
57	89952	07058	24101	41075	57976	74798	91537	08187	24743	41200	57
58	1190238	1207343	1224384	1241357	1258257	1275078	1291815	1308464	1325018	1341473	58
59	90523	07627	24668	41640	58538	75358	92094	08740	25293	41747	59
60	90809	07912	24951	41922	58819	75637	92372	09017	25568	42020	60

Parts for Seconds.

	100°		101°		102°		103°		104°		105°		106°		107°		108°		109°		110°	
"	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	"
1	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	1
2	10	10	10	10	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	2
3	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	3
4	19	19	19	19	19	19	19	19	19	19	19	19	19	19	19	18	18	18	18	18	18	4
5	24	24	24	24	24	24	24	24	24	23	23	23	23	23	23	23	23	23	23	23	23	5
6	29	29	29	29	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28	27	27	6
7	33	33	33	33	33	33	33	33	33	33	33	33	33	33	32	32	32	32	32	32	32	7
8	38	38	38	38	38	38	38	38	38	38	37	37	37	37	37	37	37	37	37	37	36	8
9	43	43	43	43	43	43	43	42	42	42	42	42	42	42	42	42	41	41	41	41	41	9
10	48	48	48	48	47	47	47	47	47	47	47	47	47	46	46	46	46	46	46	46	46	10
11	53	52	52	52	52	52	52	52	52	52	52	51	51	51	51	51	51	51	50	50	50	11
12	57	57	57	57	57	57	57	57	56	56	56	56	56	56	56	55	55	55	55	55	55	12
13	62	62	62	62	62	62	61	61	61	61	61	61	61	60	60	60	60	60	60	59	59	13
14	67	67	67	67	66	66	66	66	66	66	66	65	65	65	65	65	65	64	64	64	64	14
15	72	71	71	71	71	71	71	71	71	70	70	70	70	70	70	69	69	69	69	69	68	15
16	76	76	76	76	76	76	76	75	75	75	75	75	75	74	74	74	74	74	73	73	73	16
17	81	81	81	81	81	80	80	80	80	80	80	79	79	79	79	79	78	78	78	78	77	17
18	86	86	86	86	85	85	85	85	85	84	84	84	84	84	83	83	83	83	83	82	82	18
19	91	91	90	90	90	90	90	90	89	89	89	89	89	88	88	88	88	87	87	87	87	19
20	95	95	95	95	95	95	94	94	94	94	94	93	93	93	93	92	92	92	92	91	91	20
21	100	100	100	100	100	99	99	99	99	99	98	98	98	98	97	97	97	97	96	96	96	21
22	105	105	105	105	104	104	104	104	103	103	103	103	103	102	102	102	101	101	101	101	100	22
23	110	110	109	109	109	109	109	108	108	108	108	107	107	107	107	106	106	106	105	105	105	23
24	115	114	114	114	114	114	113	113	113	113	112	112	112	112	111	111	111	110	110	110	109	24
25	119	119	119	119	119	118	118	118	118	117	117	117	117	116	116	116	115	115	115	114	114	25
26	124	124	124	124	123	123	123	123	122	122	122	121	121	121	121	120	120	120	119	119	118	26
27	129	129	128	128	128	128	128	127	127	127	126	126	126	125	125	125	124	124	124	123	123	27
28	134	133	133	133	133	133	132	132	132	131	131	131	131	130	130	129	129	129	128	128	128	28
29	138	138	138	138	138	137	137	137	136	136	136	135	135	135	134	134	134	133	133	133	132	29
30	143	143	143	143	142	142	142	141	141	141	140	140	140	139	139	139	138	138	138	137	137	30
31	148	148	148	147	147	147	146	146	146	145	145	145	144	144	144	143	143	143	142	142	141	31
32	153	152	152	152	152	152	151	151	151	150	150	150	150	149	148	148	148	147	147	146	146	32
33	158	157	157	157	156	156	156	156	155	155	154	154	154	153	153	153	152	152	151	151	150	33
34	162	162	162	162	161	161	161	160	160	160	159	159	158	158	158	157	157	156	156	155	155	34
35	167	167	167	166	166	166	165	165	165	164	164	164	163	163	162	162	161	161	160	160	159	35
36	172	172	171	171	171	170	170	170	169	169	169	168	168	167	167	166	166	166	165	165	164	36
37	177	176	176	176	175	175	175	174	174	174	173	173	172	172	172	171	171	170	170	169	169	37
38	181	181	181	181	181	180	180	179	179	178	178	178	177	177	176	176	175	175	174	174	173	38
39	186	186	186	185	185	185	184	184	183	183	183	182	182	181	181	180	180	179	179	178	178	39
40	191	191	190	190	190	189	189	189	188	188	187	187	186	186	185	185	184	184	183	183	182	40
41	196	195	195	195	194	194	194	193	193	192	192	192	191	191	190	190	189	188	188	187	187	41
42	201	200	200	200	199	199	198	198	198	197	197	196	196	195	195	194	194	193	193	192	191	42
43	205	205	205	204	204	204	203	203	202	202	201	201	200	200	199	199	198	198	197	197	196	43
44	210	210	209	209	209	208	208	207	207	207	206	206	205	205	204	203	203	202	202	201	200	44
45	215	214	214	214	213	213	213	212	212	211	211	210	210	209	209	208	207	207	206	206	205	45
46	220	219	219	219	218	218	217	217	216	216	215	215	214	214	213	213	212	211	211	210	210	46
47	224	224	224	223	223	222	222	222	221	221	220	220	219	218	218	217	217	216	215	215	214	47
48	229	229	228	228	228	227	227	226	226	225	225	224	224	223	223	222	221	221	220	219	219	48
49	234	234	233	233	232	232	231	231	231	230	229	229	228	228	228	227	226	225	225	224	223	49
50	239	238	238	238	237	237	236	236	235	235	234	234	233	232	232	231	231	230	229	229	228	50
51	243	243	243	242	242	241	241	240	240	239	239	238	238	237	236	236	235	234	234	233	232	51
52	248	248	247	247	247	246	246	245	245	244	243	243	242	242	241	240	240	239	238	238	237	52
53	253	253	252	252	251	251	250	250	249	249	248	248	247	246	246	245	244	244	243	242	241	53
54	258	257	257	257	256	256	255	255	254	253	253	252	252	251	250	250	249	248	248	247	246	54
55	263	262	262	261	261	260	260	259	259	258	258	257	256	256	255	254	254	253	252	251	251	55
56	267	267	267	266	266	265	265	264	263	263	262	262	261	260	260	259	258	257	257	256	255	56
57	272	272	271	271	270	270	270	269	268	268	267	266	266	265	264	264	263	262	261	261	260	57
58	277	276	276	276	275	275	274	273	273	272	272	271	270	270	269	268	267	267	266	265	264	58
59	282	281	281	280	280	279	279	278	277	277	276	276	275	274	274	273	272	271	270	270	269	59
60	286	286	286	285	284	284	283	283	282	282	281	280	280	279	278	277	277	276	275	274	273	60

Natural Versines.

′	110°	111°	112°	113°	114°	115°	116°	117°	118°	119°	′
0	1342020	1358368	1374607	1390731	1406737	1422618	1438371	1453991	1469472	1484810	0
1	1342294	1358640	1374876	1390999	1407002	1422882	1438633	1454250	1469728	1485064	1
2	42567	58911	75146	91267	07268	23146	38894	54509	69985	85318	2
3	42840	59183	75416	91534	07534	23409	39155	54768	70242	85573	3
4	1343113	1359454	1375685	1391802	1407799	1423673	1439417	1455027	1470499	1485827	4
5	43387	59725	75955	92070	08065	23936	39678	55286	70755	86081	5
6	43660	59997	76224	92337	08331	24199	39939	55545	71012	86335	6
7	1343933	1360268	1376494	1392605	1408596	1424463	1440200	1455804	1471269	1486590	7
8	44206	60540	76763	92872	08862	24726	40462	56063	71525	86844	8
9	44479	60811	77033	93140	09127	24990	40723	56322	71782	87098	9
10	1344752	1361082	1377302	1393407	1409392	1425253	1440984	1456580	1472038	1487352	10
11	45025	61353	77571	93675	09658	25516	41245	56839	72294	87606	11
12	45298	61625	77841	93942	09923	25779	41506	57098	72551	87860	12
13	1345571	1361896	1378110	1394209	1410188	1426043	1441767	1457357	1472807	1488114	13
14	45844	62167	78379	94477	10454	26306	42028	57615	73063	88367	14
15	46117	62438	78649	94744	10719	26569	42289	57874	73320	88621	15
16	1346390	1362709	1378918	1395011	1410984	1426832	1442550	1458133	1473576	1488875	16
17	46663	62980	79187	95278	11249	27095	42810	58391	73832	89129	17
18	46936	63251	79456	95546	11514	27358	43071	58650	74088	89383	18
19	1347209	1363522	1379725	1395813	1411780	1427621	1443332	1458908	1474344	1489636	19
20	47481	63793	79994	96080	12045	27884	43593	59167	74600	89890	20
21	47754	64064	80263	96347	12310	28147	43853	59425	74856	90143	21
22	1348027	1364335	1380532	1396614	1412575	1428410	1444114	1459683	1475112	1490397	22
23	48299	64606	80801	96881	12840	28672	44375	59942	75368	90650	23
24	48572	64877	81070	97148	13104	28935	44635	60200	75624	90904	24
25	1348845	1365148	1381339	1397415	1413369	1429198	1444896	1460458	1475880	1491157	25
26	49117	65418	81608	97682	13634	29461	45156	60716	76136	91411	26
27	49390	65689	81877	97949	13899	29723	45417	60974	76392	91664	27
28	1349662	1365960	1382146	1398216	1414164	1429986	1445677	1461233	1476647	1491917	28
29	49935	66231	82415	98482	14429	30249	45938	61491	76903	92170	29
30	50207	66501	82683	98749	14693	30511	46198	61749	77159	92424	30
31	1350480	1366772	1382952	1399016	1414958	1430774	1446458	1462007	1477414	1492677	31
32	50752	67043	83221	99283	15223	31036	46718	62265	77670	92930	32
33	51025	67313	83490	99549	15487	31299	46979	62523	77926	93183	33
34	1351297	1367584	1383758	1399816	1415752	1431561	1447239	1462780	1478181	1493436	34
35	51569	67854	84027	1400083	16016	31823	47499	63038	78436	93689	35
36	51842	68125	84295	00349	16281	32086	47759	63296	78692	93942	36
37	1352114	1368395	1384564	1400616	1416545	1432348	1448019	1463554	1478947	1494195	37
38	52386	68665	84832	00882	16810	32610	48279	63812	79203	94448	38
39	52658	68936	85101	01149	17074	32873	48539	64069	79458	94701	39
40	1352931	1369206	1385369	1401415	1417339	1433135	1448799	1464327	1479713	1494953	40
41	53203	69477	85638	01681	17603	33397	49059	64585	79968	95206	41
42	53475	69747	85906	01948	17867	33659	49319	64842	80224	95459	42
43	1353747	1370017	1386174	1402214	1418131	1433921	1449579	1465100	1480479	1495711	43
44	54019	70287	86443	02480	18396	34183	49839	65357	80734	95964	44
45	54291	70557	86711	02747	18660	34445	50098	65615	80989	96217	45
46	1354563	1370828	1386979	1403013	1418924	1434707	1450358	1465872	1481244	1496469	46
47	54835	71098	87247	03279	19188	34969	50618	66129	81499	96722	47
48	55107	71368	87516	03545	19452	35231	50878	66387	81754	96974	48
49	1355379	1371638	1387784	1403811	1419716	1435493	1451137	1466644	1482009	1497226	49
50	55651	71908	88052	04078	19980	35755	51397	66901	82263	97479	50
51	55923	72178	88320	04344	20244	36017	51656	67158	82518	97731	51
52	1356194	1372448	1388588	1404610	1420508	1436278	1451916	1467416	1482773	1497983	52
53	56466	72718	88856	04876	20772	36540	52175	67673	83028	98236	53
54	56738	72988	89124	05142	21036	36802	52435	67930	83282	98488	54
55	1357010	1373258	1389392	1405408	1421300	1437063	1452694	1468187	1483537	1498740	55
56	57281	73528	89660	05673	21563	37325	52954	68444	83792	98992	56
57	57553	73797	89928	05939	21827	37587	53213	68701	84046	99244	57
58	1357825	1374067	1390196	1406205	1422091	1437848	1453472	1468958	1484301	1499496	58
59	58096	74337	90463	06471	22355	38110	53731	69215	84555	99748	59
60	58368	74607	90731	06737	22618	38371	53991	69472	84810	1500000	60

Parts for Seconds.

	110°		111°		112°		113°		114°		115°		116°		117°		118°		119°		120°	
"	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	"
1	5	5	5	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	1
2	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	8	8	8	2
3	14	14	14	14	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	3
4	18	18	18	18	18	18	18	18	18	18	18	18	17	17	17	17	17	17	17	17	17	4
5	23	23	23	23	22	22	22	22	22	22	22	22	22	22	22	21	21	21	21	21	21	5
6	27	27	27	27	27	27	27	27	27	26	26	26	26	26	26	26	26	26	25	25	25	6
7	32	32	32	32	31	31	31	31	31	31	31	31	31	30	30	30	30	30	30	30	29	7
8	36	36	36	36	36	36	36	36	35	35	35	35	35	35	35	34	34	34	34	34	34	8
9	41	41	41	41	40	40	40	40	40	40	40	39	39	39	39	39	39	38	38	38	38	9
10	46	45	45	45	45	45	45	44	44	44	44	44	44	43	43	43	43	43	42	42	42	10
11	50	50	50	50	49	49	49	49	49	48	48	48	48	48	48	47	47	47	47	46	46	11
12	55	54	54	54	54	54	53	53	53	53	53	53	52	52	52	52	51	51	51	51	50	12
13	59	59	59	59	58	58	58	58	58	57	57	57	57	56	56	56	56	55	55	55	55	13
14	64	64	63	63	63	63	62	62	62	62	62	61	61	61	60	60	60	60	59	59	59	14
15	68	68	68	68	67	67	67	67	66	66	66	66	65	65	65	64	64	64	64	63	63	15
16	73	73	72	72	72	72	71	71	71	71	70	70	70	69	69	69	68	68	68	68	67	16
17	77	77	77	77	76	76	76	76	75	75	75	74	74	74	73	73	73	72	72	72	71	17
18	82	82	81	81	81	81	80	80	80	79	79	79	78	78	78	77	77	77	76	76	76	18
19	87	86	86	86	85	85	85	84	84	84	83	83	83	82	82	82	81	81	81	80	80	19
20	91	91	91	90	90	90	89	89	89	88	88	88	87	87	86	86	86	85	85	84	84	20
21	96	95	95	95	94	94	94	93	93	93	92	92	92	91	91	90	90	89	89	89	88	21
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23	105	104	104	104	103	103	103	102	102	101	101	101	100	100	99	99	98	98	98	97	97	23
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41	187	186	186	185	184	184	183	182	182	181	180	179	179	178	177	176	176	175	174	173	172	41
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43	196	195	195	194	193	193	192	191	190	190	189	188	187	187	186	185	184	183	182	181	181	43
44	200	200	199	198	198	197	197	196	195	194	193	193	192	191	190	189	188	187	187	186	185	44
45	205	204	204	203	202	201	201	200	199	199	198	197	196	195	194	193	193	192	191	190	189	45
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47	214	213	213	212	211	211	210	209	208	207	207	206	205	204	203	202	201	200	199	198	197	47
48	219	218	217	217	216	215	214	213	213	212	211	210	209	208	207	206	205	205	204	203	202	48
49	223	222	222	221	220	220	219	218	217	216	215	214	214	213	212	211	210	209	208	207	206	49
50	228	227	226	226	225	224	223	222	221	221	220	219	218	217	216	215	214	213	212	211	210	50
51	232	232	231	230	229	228	228	227	226	225	224	223	222	221	220	219	218	217	216	215	214	51
52	237	236	235	235	234	233	232	231	230	229	228	228	227	226	225	224	223	221	220	219	218	52
53	241	241	240	239	238	237	237	236	235	234	233	232	231	230	229	228	227	226	225	224	223	53
54	246	245	244	244	243	242	241	240	239	238	237	236	235	234	233	232	231	230	229	228	227	54
55	251	250	249	248	247	246	245	245	244	243	242	241	240	239	238	236	235	234	233	232	231	55
56	255	254	253	253	252	251	250	249	248	247	246	245	244	243	242	241	240	239	237	236	235	56
57	260	259	258	257	256	255	254	253	252	251	250	249	249	247	246	245	244	243	242	240	239	57
58	264	263	262	262	261	260	259	258	257	256	255	254	253	252	251	249	248	247	246	245	244	58
59	269	268	267	266	265	264	263	262	261	260	259	258	257	256	255	254	253	251	250	249	248	59
60	273	272	272	271	270	269	268	267	266	265	264	263	261	260	259	258	257	256	254	253	252	60

Natural Versines.

′	120°	121°	122°	123°	124°	125°	126°	127°	128°	129°	′
0	1500000	1515038	1529919	1544639	1559193	1573576	1587785	1601815	1615662	1629320	0
1	1500252	1515287	1530166	1544883	1559434	1573815	1588021	1602047	1615891	1629546	1
2	00504	15537	30413	45127	59675	74053	88256	02280	16120	29772	2
3	00756	15786	30659	45371	59916	74291	88491	02512	16349	29998	3
4	1501007	1516035	1530906	1545615	1560157	1574529	1588726	1602744	1616578	1630224	4
5	01259	16284	31152	45858	60398	74767	88961	02976	16807	30450	5
6	01511	16533	31399	46102	60639	75005	89196	03208	17036	30676	6
7	1501762	1516782	1531645	1546346	1560880	1575243	1589431	1603440	1617265	1630902	7
8	02014	17031	31891	46589	61121	75481	89666	03672	17494	31127	8
9	02266	17280	32138	46833	61361	75719	89901	03904	17722	31353	9
10	1502517	1517529	1532384	1547076	1561602	1575957	1590136	1604136	1617951	1631578	10
11	02769	17778	32630	47320	61843	76195	90371	04367	18180	31804	11
12	03020	18027	32876	47563	62083	76432	90606	04599	18408	32029	12
13	1503271	1518276	1533122	1547807	1562324	1576670	1590840	1604831	1618637	1632255	13
14	03523	18525	33369	48050	62565	76908	91075	05062	18865	32480	14
15	03774	18773	33615	48293	62805	77145	91310	05294	19094	32705	15
16	1504025	1519022	1533861	1548537	1563045	1577383	1591544	1605526	1619322	1632931	16
17	04277	19271	34107	48780	63286	77620	91779	05757	19551	33156	17
18	04528	19519	34352	49023	63526	77858	92013	05988	19779	33381	18
19	1504779	1519768	1534598	1549266	1563766	1578095	1592248	1606220	1620007	1633606	19
20	05030	20016	34844	49509	64007	78332	92482	06451	20236	33831	20
21	05281	20265	35090	49752	64247	78570	92716	06682	20464	34056	21
22	1505532	1520513	1535336	1549995	1564487	1578807	1592951	1606914	1620692	1634281	22
23	05783	20761	35581	50238	64727	79044	93185	07145	20920	34506	23
24	06034	21010	35827	50481	64967	79281	93419	07376	21148	34731	24
25	1506285	1521258	1536072	1550724	1565207	1579518	1593653	1607607	1621376	1634955	25
26	06536	21506	36318	50966	65447	79755	93887	07838	21604	35180	26
27	06786	21754	36563	51209	65687	79992	94121	08069	21831	35405	27
28	1507037	1522002	1536809	1551452	1565927	1580229	1594355	1608300	1622059	1635629	28
29	07288	22251	37054	51694	66167	80466	94589	08531	22287	35854	29
30	07538	22499	37300	51937	66406	80703	94823	08761	22515	36078	30
31	1507789	1522747	1537545	1552180	1566646	1580940	1595057	1608992	1622742	1636303	31
32	08040	22995	37790	52422	66886	81177	95290	09223	22970	36527	32
33	08290	23242	38035	52665	67125	81413	95524	09454	23197	36751	33
34	1508541	1523490	1538281	1552907	1567365	1581650	1595758	1609684	1623425	1636976	34
35	08791	23738	38526	53149	67604	81886	95991	09915	23652	37200	35
36	09041	23986	38771	53392	67844	82123	96225	10145	23880	37424	36
37	1509292	1524234	1539016	1553634	1568083	1582360	1596458	1610376	1624107	1637648	37
38	09542	24481	39261	53876	68323	82596	96692	10606	24334	37872	38
39	09792	24729	39506	54118	68562	82832	96925	10836	24561	38096	39
40	1510043	1524977	1539751	1554360	1568801	1583069	1597159	1611067	1624789	1638320	40
41	10293	25224	39996	54602	69040	83305	97392	11297	25016	38544	41
42	10543	25472	40240	54844	69280	83541	97625	11527	25243	38768	42
43	1510793	1525719	1540485	1555086	1569519	1583777	1597858	1611757	1625470	1638992	43
44	11043	25967	40730	55328	69758	84014	98092	11987	25697	39215	44
45	11293	26214	40975	55570	69997	84250	98325	12217	25924	39439	45
46	1511543	1526461	1541219	1555812	1570236	1584486	1598558	1612447	1626150	1639663	46
47	11793	26709	41464	56054	70475	84722	98791	12677	26377	39886	47
48	12043	26956	41708	56296	70714	84958	99024	12907	26604	40110	48
49	15.2293	1527203	1541953	1556537	1570952	1585194	1599257	1613137	1626831	1640333	49
50	12543	27450	42197	56779	71191	85429	99489	13367	27057	40557	50
51	12792	27697	42442	57021	71430	85665	99722	13596	27284	40780	51
52	1513042	1527944	1542686	1557262	1571669	1585901	1599955	1613826	1627510	1641003	52
53	13292	28191	42930	57504	71907	86137	1600188	14056	27737	41226	53
54	13541	28438	43174	57745	72146	86372	00420	14285	27963	41450	54
55	1513791	1528685	1543419	1557987	1572384	1586608	1600653	1614515	1628189	1641673	55
56	14040	28932	43663	58228	72623	86844	00885	14744	28416	41896	56
57	14290	29179	43907	58469	72861	87079	01118	14974	28642	42119	57
58	1514539	1529426	1544151	1558711	1573100	1587315	1601350	1615203	1628868	1642342	58
59	14789	29673	44395	58952	73338	87550	01583	15432	29094	42565	59
60	15038	29919	44639	59193	73576	87785	01815	15662	29320	42788	60

Parts for Seconds.

	120°		121°		122°		123°		124°		125°		126°		127°		128°		129°		130°	
″	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	″
1	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	1
2	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	7	7	2
3	13	13	12	12	12	12	12	12	12	12	12	12	12	12	12	12	11	11	11	11	11	3
4	17	17	17	17	16	16	16	16	16	16	16	16	16	16	15	15	15	15	15	15	15	4
5	21	21	21	21	21	20	20	20	20	20	20	20	20	19	19	19	19	19	19	19	19	5
6	25	25	25	25	25	25	24	24	24	24	24	24	24	23	23	23	23	23	23	22	22	6
7	29	29	29	29	29	29	28	28	28	28	28	28	27	27	27	27	27	27	26	26	26	7
8	34	33	33	33	33	33	32	32	32	32	32	32	31	31	31	31	31	30	30	30	30	8
9	38	38	37	37	37	37	37	36	36	36	36	36	35	35	35	35	34	34	34	34	33	9
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11	46	46	46	45	45	45	45	44	44	44	44	43	43	43	43	42	42	42	41	41	41	11
12	50	50	50	50	49	49	49	49	48	48	48	47	47	47	46	46	46	46	45	45	45	12
13	55	54	54	54	53	53	53	53	52	52	52	51	51	51	50	50	50	49	49	49	48	13
14	59	58	58	58	58	57	57	57	56	56	56	55	55	55	54	54	53	53	52	52	52	14
15	63	63	62	62	62	61	61	61	60	60	60	59	59	58	58	58	57	57	57	56	56	15
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17	71	71	71	70	70	70	69	69	68	68	68	67	67	66	66	65	65	64	64	64	63	17
18	76	75	75	74	74	74	73	73	72	72	71	71	71	70	70	69	69	68	68	67	67	18
19	80	79	79	79	78	78	77	77	76	76	75	75	75	74	74	73	73	72	72	71	71	19
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21	88	88	87	87	86	86	85	85	84	84	83	83	82	82	81	81	80	80	79	79	78	21
22	92	92	91	91	90	90	89	89	88	88	87	87	86	86	85	85	84	83	83	82	82	22
23	97	96	96	95	95	94	94	93	92	92	91	91	90	90	89	88	88	87	87	86	85	23
24	101	100	100	99	99	98	98	97	96	96	95	95	94	94	93	92	92	91	90	90	89	24
25	105	104	104	103	103	102	102	101	100	100	99	99	98	97	97	96	96	95	94	94	93	25
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35	147	146	145	145	144	143	142	141	141	140	139	138	137	136	136	135	134	133	132	131	130	35
36	151	150	150	149	148	147	146	146	145	144	143	142	141	140	139	138	138	137	136	135	134	36
37	155	155	154	153	152	151	150	150	149	148	147	146	145	144	143	142	141	140	139	139	137	37
38	160	159	158	157	156	155	154	154	153	152	151	150	149	148	147	146	145	144	143	142	141	38
39	164	163	162	161	160	159	159	158	157	156	155	154	153	152	151	150	149	148	147	146	145	39
40	168	167	166	165	164	164	163	162	161	160	159	158	157	156	155	154	153	152	151	150	149	40
41	172	171	170	169	169	168	167	166	165	164	163	162	161	160	159	158	157	156	154	153	152	41
42	176	175	175	174	173	172	171	170	169	168	167	166	165	164	163	162	160	159	158	157	156	42
43	181	180	179	178	177	176	175	174	173	172	171	170	169	168	166	165	164	163	162	161	160	43
44	185	184	183	182	181	180	179	178	177	176	175	174	173	171	170	169	168	167	166	165	163	44
45	189	188	187	186	185	184	183	182	181	180	179	178	177	175	174	173	172	171	170	168	167	45
46	193	192	191	191	189	188	187	186	185	184	183	182	180	179	178	177	176	175	173	172	171	46
47	197	196	195	194	193	192	191	190	189	188	187	185	184	183	182	181	180	178	177	176	175	47
48	202	201	199	198	197	196	195	194	193	192	191	190	188	187	186	185	183	182	181	180	178	48
49	206	205	204	203	201	200	199	198	197	196	195	193	192	191	190	188	187	186	185	183	182	49
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51	214	213	212	211	210	209	207	206	205	204	203	201	200	199	197	196	195	194	192	191	189	51
52	218	217	216	215	214	213	211	210	209	208	207	205	204	203	201	200	199	197	196	195	193	52
53	223	221	220	219	218	217	215	214	213	212	210	209	208	207	205	204	203	201	200	198	197	53
54	227	226	224	223	222	221	220	218	217	216	214	213	212	210	209	208	206	205	203	202	201	54
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56	235	234	233	232	230	229	228	226	225	224	222	221	220	218	217	215	214	212	211	209	208	56
57	239	238	237	236	234	233	232	230	229	228	226	225	224	222	221	219	218	216	215	213	212	57
58	244	242	241	240	238	237	236	234	233	232	230	229	228	226	225	223	222	220	219	217	215	58
59	248	246	246	244	243	241	240	239	237	236	234	233	231	230	228	227	225	224	222	221	219	59
60	252	251	249	248	247	245	244	243	241	240	238	237	235	234	232	231	229	228	226	224	223	60

Natural Versines.

′	130°	131°	132°	133°	134°	135°	136°	137°	138°	139°	′
0	1642788	1656059	1669131	1681998	1694658	1707107	1719340	1731354	1743145	1754710	0
1	1643010	1656279	1669347	1682211	1694868	1707312	1719542	1731552	1743339	1754900	1
2	43233	56498	69563	82424	95077	07518	19744	31750	43534	55091	2
3	43456	56717	69779	82636	95286	07724	19946	31949	43729	55282	3
4	1643679	1656937	1669995	1682849	1695495	1707929	1720148	1732147	1743923	1755472	4
5	43901	57156	70211	83061	95704	08135	20349	32345	44117	55663	5
6	44124	57375	70427	83274	95913	08340	20551	32543	44312	55854	6
7	1644346	1657594	1670642	1683486	1696122	1708545	1720753	1732741	1744506	1756044	7
8	44569	57814	70858	83696	96331	08750	20954	32939	44700	56234	8
9	44791	58033	71074	83911	96539	08956	21156	33137	44894	56425	9
10	1645013	1658252	1671290	1684123	1696748	1709161	1721357	1733335	1745088	1756615	10
11	45236	58471	71505	84335	96957	09366	21559	33532	45282	56805	11
12	45458	58690	71721	84547	97165	09571	21760	33730	45476	56995	12
13	1645680	1658908	1671936	1684759	1697374	1709776	1721962	1733928	1745670	1757185	13
14	45902	59127	72152	84971	97582	09981	22163	34125	45864	57375	14
15	46124	59346	72367	85183	97791	10185	22364	34323	46057	57565	15
16	1646346	1659565	1672582	1685395	1697999	1710390	1722565	1734520	1746251	1757755	16
17	46568	59783	72797	85607	98207	10595	22766	34717	46445	57945	17
18	46790	60002	73013	85818	98415	10800	22967	34915	46638	58134	18
19	1647012	1660220	1673228	1686030	1698623	1711004	1723168	1735112	1746832	1758324	19
20	47233	60439	73443	86242	98832	11209	23369	35309	47025	58514	20
21	47455	60657	73658	86453	99040	11413	23570	35506	47218	58703	21
22	1647677	1660875	1673873	1686665	1699248	1711617	1723771	1735703	1747412	1758893	22
23	47898	61094	74088	86876	99456	11822	23971	35900	47605	59082	23
24	48120	61312	74302	87088	99663	12026	24172	36097	47798	59271	24
25	1648341	1661530	1674517	1687299	1699871	1712230	1724372	1736294	1747991	1759461	25
26	48563	61748	74732	87510	1700079	12434	24573	36491	48184	59650	26
27	48784	61966	74947	87721	00287	12639	24773	36688	48377	59839	27
28	1649006	1662184	1675161	1687933	1700494	1712843	1724974	1736884	1748570	1760028	28
29	49227	62402	75376	88144	00702	13047	25174	37081	48763	60217	29
30	49448	62620	75590	88355	00909	13250	25374	37277	48956	60406	30
31	1649669	1662838	1675805	1688566	1701117	1713454	1725575	1737474	1749148	1760595	31
32	49890	63056	76019	88777	01324	13658	25775	37670	49341	60784	32
33	50111	63273	76233	88987	01531	13862	25975	37867	49534	60972	33
34	1650332	1663491	1676448	1689198	1701739	1714066	1726175	1738063	1749726	1761161	34
35	50553	63709	76662	89409	01946	14269	26375	38259	49919	61350	35
36	50774	63926	76876	89620	02153	14473	26576	38455	50111	61538	36
37	1650995	1664144	1677090	1689830	1702360	1714676	1726775	1738652	1750303	1761727	37
38	51216	64361	77304	90041	02567	14880	26974	38848	50496	61915	38
39	51437	64579	77518	90251	02774	15083	27174	39044	50688	62104	39
40	1651657	1664796	1677732	1690462	1702981	1715286	1727374	1739239	1750880	1762292	40
41	51878	65013	77946	90672	03188	15490	27573	39435	51072	62480	41
42	52098	65230	78160	90882	03395	15693	27773	39631	51264	62668	42
43	1652319	1665448	1678373	1691093	1703601	1715896	1727972	1739827	1751456	1762856	43
44	52539	65665	78587	91303	03808	16099	28172	40023	51648	63045	44
45	52760	65882	78801	91513	04015	16302	28371	40218	51840	63233	45
46	1652980	1666099	1679014	1691723	1704221	1716505	1728570	1740414	1752032	1763420	46
47	53200	66316	79228	91933	04428	16708	28770	40609	52223	63608	47
48	53421	66533	79441	92143	04634	16911	28969	40805	52415	63796	48
49	1653641	1666749	1679655	1692353	1704841	1717113	1729168	1741000	1752607	1763984	49
50	53861	66966	79868	92563	05047	17316	29367	41195	52798	64171	50
51	54081	67183	80081	92773	05253	17519	29566	41391	52989	64359	51
52	1654301	1667399	1680295	1692983	1705459	1717721	1729765	1741586	1753181	1764547	52
53	54521	67616	80508	93192	05665	17924	29963	41781	53372	64734	53
54	54741	67833	80721	93402	05872	18126	30162	41976	53563	64921	54
55	1654961	1668049	1680934	1693611	1706078	1718329	1730361	1742171	1753755	1765109	55
56	55180	68266	81147	93821	06284	18531	30560	42366	53946	65296	56
57	55400	68482	81360	94030	06489	18733	30758	42561	54137	65483	57
58	1655620	1668698	1681573	1694240	1706695	1718936	1730957	1742755	1754328	1765670	58
59	55840	68914	81786	94449	06901	19138	31155	42950	54519	65857	59
60	56059	69131	81998	94658	07107	19340	31354	43145	54710	66044	60

Parts for Seconds.

	130°		131°		132°		133°		134°		135°		136°		137°		138°		139°		140°	
"	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	"
1	4	4	4	4	4	4	4	4	3	3	3	3	3	3	3	3	3	3	3	3	3	1
2	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	6	6	6	6	6	2
3	11	11	11	11	11	11	11	11	10	10	10	10	10	10	10	10	10	10	10	9	9	3
4	15	15	15	15	14	14	14	14	14	14	14	14	13	13	13	13	13	13	13	13	12	4
5	19	18	18	18	18	18	18	18	17	17	17	17	17	17	17	16	16	16	16	16	16	5
6	22	22	22	22	22	21	21	21	21	21	21	20	20	20	20	20	19	19	19	19	19	6
7	26	26	26	25	25	25	25	25	24	24	24	24	24	23	23	23	23	22	22	22	22	7
8	30	29	29	29	29	29	28	28	28	28	27	27	27	27	26	26	26	26	25	25	25	8
9	33	33	33	33	32	32	32	32	31	31	31	31	30	30	30	29	29	29	29	28	28	9
10	37	37	37	36	36	36	35	35	35	35	34	34	34	33	33	33	32	32	32	31	31	10
11	41	41	40	40	40	39	39	39	38	38	38	37	37	37	36	36	36	35	35	35	34	11
12	45	44	44	44	43	43	43	42	42	41	41	41	40	40	40	39	39	39	38	38	37	12
13	48	48	48	47	47	46	46	46	45	45	45	44	44	43	43	43	42	42	41	41	41	13
14	52	52	51	51	50	50	50	49	49	48	48	47	47	47	46	46	45	45	45	44	44	14
15	56	55	55	54	54	54	53	53	52	52	51	51	51	50	50	49	49	48	48	47	47	15
16	59	59	59	58	58	57	57	56	56	55	55	54	54	53	53	52	52	51	51	50	50	16
17	63	63	62	62	61	61	60	60	59	59	58	58	57	57	56	56	55	55	54	54	53	17
18	67	66	66	65	65	64	64	63	63	62	62	61	61	60	60	59	58	58	57	57	56	18
19	71	70	70	69	68	68	67	67	66	66	65	65	64	63	63	62	62	61	60	60	59	19
20	74	74	73	73	72	71	71	70	70	69	69	68	67	67	66	65	65	64	64	63	62	20
21	78	77	77	76	76	75	74	74	73	73	72	71	70	70	69	69	68	67	67	66	65	21
22	82	81	80	80	79	79	78	77	77	76	75	75	74	73	73	72	71	71	70	69	69	22
23	85	85	84	84	83	82	82	81	80	80	79	78	77	77	76	75	75	74	73	72	72	23
24	89	88	88	87	86	86	85	84	84	83	82	82	81	80	79	79	78	77	76	76	75	24
25	93	92	91	91	90	89	89	88	87	86	86	85	84	83	83	82	81	80	80	79	78	25
26	97	96	95	94	94	93	92	91	91	90	89	88	87	87	86	85	84	84	83	82	81	26
27	100	100	99	98	97	97	96	95	94	93	92	92	91	90	89	88	88	87	86	85	84	27
28	104	103	102	102	101	100	99	98	98	97	96	96	94	93	93	92	91	90	89	88	87	28
29	108	107	106	105	104	104	103	102	101	100	99	99	98	97	96	95	94	93	92	91	90	29
30	111	111	110	109	108	107	106	105	105	104	103	102	101	100	99	98	97	96	95	94	93	30
31	115	114	113	113	112	111	110	109	108	107	106	105	104	103	103	102	101	100	99	98	97	31
32	119	118	117	116	115	114	113	113	112	111	110	109	108	107	106	105	104	103	102	101	100	32
33	123	122	121	120	119	118	117	116	115	114	113	112	111	110	109	108	107	106	105	104	103	33
34	126	125	124	123	123	121	121	120	119	118	117	116	114	113	112	111	110	109	108	107	106	34
35	130	129	128	127	126	125	124	123	122	121	120	119	118	117	116	115	114	112	111	110	109	35
36	134	133	132	131	130	129	128	127	126	124	123	122	121	120	119	118	117	116	115	113	112	36
37	137	136	135	134	133	132	131	130	129	128	127	126	125	123	122	121	120	119	118	117	115	37
38	141	140	139	138	137	136	135	134	133	131	130	129	128	127	126	124	123	122	121	120	118	38
39	145	144	143	142	141	139	138	137	136	135	134	132	131	130	129	128	126	125	124	123	122	39
40	149	147	146	145	144	143	142	141	139	138	137	136	135	133	132	131	130	128	127	126	125	40
41	152	151	150	149	148	147	145	144	143	142	141	139	138	137	136	134	133	132	130	129	128	41
42	156	155	154	152	151	150	149	148	146	145	144	143	141	140	139	138	136	135	134	132	131	42
43	160	159	157	156	155	154	152	151	150	149	147	146	145	144	142	141	139	138	137	135	134	43
44	163	162	161	160	159	157	156	155	153	152	151	150	148	147	145	144	143	141	140	139	137	44
45	167	166	165	163	162	161	160	158	157	156	154	153	152	150	149	147	146	145	143	142	140	45
46	171	170	168	167	166	164	163	162	160	159	158	156	155	154	152	151	149	148	146	145	143	46
47	175	173	172	171	169	168	167	165	164	163	161	160	158	157	155	154	152	151	150	148	146	47
48	178	177	176	174	173	172	170	169	167	166	165	163	162	160	159	157	156	154	153	151	150	48
49	182	181	179	178	177	175	174	172	171	169	168	167	165	164	162	160	159	157	156	154	153	49
50	186	184	183	182	180	179	177	176	174	173	171	170	168	167	165	164	162	161	160	157	156	50
51	189	188	187	185	184	182	181	179	178	176	175	173	172	170	169	167	165	164	162	161	159	51
52	193	192	190	189	187	186	184	183	181	180	178	177	175	174	172	170	169	167	165	164	162	52
53	197	195	194	192	191	189	188	186	185	183	182	180	178	177	175	174	172	170	169	167	165	53
54	201	199	198	196	195	193	191	190	188	187	185	184	182	180	179	177	175	173	172	170	168	54
55	204	203	201	200	198	197	195	193	192	190	189	187	185	184	182	180	178	177	175	173	171	55
56	208	206	205	203	202	200	199	197	195	194	192	190	189	187	185	183	182	180	178	176	174	56
57	212	210	209	207	205	204	202	200	199	197	195	194	192	190	188	187	185	183	181	180	178	57
58	215	214	212	211	209	207	206	204	202	200	199	197	195	194	192	190	188	186	184	183	181	58
59	219	218	216	214	213	211	209	207	206	204	202	201	199	197	195	193	191	190	188	186	184	59
60	223	221	219	219	216	214	213	211	209	207	206	204	202	200	198	196	195	193	190	.89	187	60

Natural Versines.

′	140°	141°	142°	143°	144°	145°	146°	147°	148°	149°	′
0	1766044	1777146	1788011	1798636	1809017	1819152	1829038	1838671	1848048	1857167	0
1	1766231	1777329	1788190	1798811	1809188	1819319	1829200	1838829	1848202	1857317	1
2	66418	77512	88369	98985	09359	19486	29363	38987	48356	57467	2
3	66605	77695	88548	99160	09530	19652	29525	39146	48510	57616	3
4	1766792	1777878	1788727	1799335	1809700	1819819	1829688	1839304	1848664	1857766	4
5	66979	78060	88905	99510	09871	19985	29850	39462	48818	57916	5
6	67165	78243	89084	99685	10042	20152	30012	39620	48972	58065	6
7	1767352	1778426	1789263	1799859	1810212	1820318	1830175	1839778	1849125	1858214	7
8	67538	78608	89441	1800034	10383	20485	30337	39936	49279	58364	8
9	67725	78791	89620	00208	10553	20651	30499	40094	49433	58513	9
10	1767911	1778973	1789798	1800383	1810723	1820817	1830661	1840251	1849586	1858662	10
11	68097	79156	89977	00557	10894	20983	30823	40409	49739	58811	11
12	68284	79338	90155	00731	11064	21149	30985	40567	49893	58960	12
13	1768470	1779520	1790333	1800906	1811234	1821315	1831146	1840724	1850046	1859109	13
14	68656	79702	90512	01080	11404	21481	31308	40882	50199	59258	14
15	68842	79885	90690	01254	11574	21647	31470	41039	50352	59406	15
16	1769028	1780067	1790868	1801428	1811744	1821813	1831631	1841196	1850505	1859555	16
17	69214	80249	91046	01602	11914	21978	31793	41354	50658	59704	17
18	69400	80430	91224	01776	12084	22144	31954	41511	50811	59852	18
19	1769585	1780612	1791401	1801950	1812253	1822310	1832116	1841668	1850964	1860001	19
20	69771	80794	91579	02123	12423	22475	32277	41825	51117	60149	20
21	69957	80976	91757	02297	12593	22641	32438	41982	51269	60298	21
22	1770142	1781157	1791935	1802471	1812762	1822806	1832599	1842139	1851422	1860446	22
23	70328	81339	92112	02644	12931	22971	32760	42296	51575	60594	23
24	70513	81521	92290	02818	13101	23136	32921	42452	51727	60742	24
25	1770699	1781702	1792467	1802991	1813270	1823302	1833082	1842609	1851879	1860890	25
26	70884	81883	92645	03164	13439	23467	33243	42766	52032	61038	26
27	71069	82065	92822	03338	13608	23632	33404	42922	52184	61186	27
28	1771254	1782246	1792999	1803511	1813778	1823797	1833565	1843079	1852336	1861334	28
29	71440	82427	93176	03684	13947	23961	33725	43235	52488	61482	29
30	71625	82608	93353	03857	14116	24126	33886	43391	52640	61629	30
31	1771810	1782789	1793530	1804030	1814284	1824291	1834046	1843548	1852792	1861777	31
32	71995	82970	93707	04203	14453	24456	34207	43704	52944	61924	32
33	72179	83151	93884	04376	14622	24620	34367	43860	53096	62072	33
34	1772364	1783332	1794061	1804548	1814791	1824785	1834528	1844016	1853248	1862219	34
35	72549	83513	94238	04721	14959	24949	34688	44172	53399	62366	35
36	72734	83694	94415	04894	15128	25114	34848	44328	53551	62514	36
37	1772918	1783874	1794591	1805066	1815296	1825278	1835008	1844484	1853702	1862661	37
38	73103	84055	94768	05239	15465	25442	35168	44640	53854	62808	38
39	73287	84235	94944	05411	15633	25606	35328	44795	54005	62955	39
40	1773472	1784416	1795121	1805584	1815801	1825770	1835488	1844951	1854156	1863102	40
41	73656	84596	95297	05756	15970	25934	35648	45106	54308	63249	41
42	73840	84776	95474	05928	16138	26098	35807	45262	54459	63396	42
43	1774024	1784957	1795650	1806101	1816306	1826262	1835967	1845417	1854610	1863542	43
44	74209	85137	95826	06273	16474	26426	36127	45573	54761	63689	44
45	74393	85317	96002	06445	16642	26590	36286	45728	54912	63836	45
46	1774577	1785497	1796178	1806617	1816809	1826753	1836446	1845883	1855063	1863982	46
47	74761	85677	96354	06789	16977	26917	36605	46038	55214	64128	47
48	74945	85857	96530	06960	17145	27081	36764	46193	55364	64275	48
49	1775128	1786037	1796706	1807132	1817313	1827244	1836924	1846348	1855515	1864421	49
50	75312	86217	96882	07304	17480	27407	37083	46503	55666	64567	50
51	75496	86396	97057	07475	17648	27571	37242	46658	55816	64713	51
52	1775679	1786576	1797233	1807647	1817815	1827734	1837401	1846813	1855966	1864860	52
53	75863	86756	97408	07819	17982	27897	37560	46967	56117	65006	53
54	76046	86935	97584	07990	18150	28060	37719	47122	56267	65151	54
55	1776230	1787115	1797759	1808161	1818317	1828223	1837878	1847277	1856417	1865297	55
56	76413	87294	97935	08333	18484	28386	38036	47431	56567	65443	56
57	76597	87473	98110	08504	18651	28549	38195	47585	56718	65589	57
58	1776780	1787652	1798285	1808675	1818818	1828712	1838354	1847740	1856868	1865734	58
59	76963	87832	98460	08846	18985	28875	38512	47894	57017	65880	59
60	77146	88011	98636	09017	19152	29038	38671	48048	57167	66025	60

Parts for Seconds.

	140°		141°		142°		143°		144°		145°		146°		147°		148°		149°		150°	
"	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	"
1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	1
2	6	6	6	6	6	6	6	6	6	6	6	5	5	5	5	5	5	5	5	5	5	2
3	9	9	9	9	9	9	9	9	9	8	8	8	8	8	8	8	8	8	7	7	7	3
4	12	12	12	12	12	12	12	12	11	11	11	11	11	11	11	10	10	10	10	10	10	4
5	16	15	15	15	15	15	15	14	14	14	14	14	14	13	13	13	13	13	12	12	12	5
6	19	19	18	18	18	18	18	17	17	17	17	16	16	16	16	16	15	15	15	15	15	6
7	22	22	21	21	21	21	20	20	20	20	19	19	19	19	18	18	18	18	17	17	17	7
8	25	25	24	24	24	24	23	23	23	23	22	22	22	21	21	21	21	20	20	20	19	8
9	28	28	27	27	27	27	26	26	26	25	25	25	24	24	24	23	23	23	22	22	22	9
10	31	31	31	30	30	30	29	29	28	28	28	27	27	27	26	26	26	25	25	25	24	10
11	34	34	34	33	33	32	32	32	31	31	31	30	30	29	29	29	28	28	27	27	27	11
12	37	37	37	36	36	35	35	35	34	34	33	33	33	32	32	31	31	30	30	30	29	12
13	41	40	40	39	39	38	38	37	37	37	36	36	35	35	34	34	33	33	32	32	32	13
14	44	43	43	42	42	41	41	40	40	39	39	38	38	37	37	36	36	35	35	34	34	14
15	47	46	46	45	45	44	44	43	43	42	42	41	41	40	40	39	39	38	37	37	36	15
16	50	49	49	48	48	47	47	46	46	45	44	44	44	43	42	42	41	41	40	39	39	16
17	53	52	52	51	51	50	50	49	48	48	47	47	46	45	45	44	44	43	42	42	41	17
18	56	56	55	54	54	53	53	52	51	51	50	49	49	48	48	47	46	46	45	44	44	18
19	59	59	58	57	57	56	55	55	54	53	53	52	52	51	50	49	49	48	47	47	46	19
20	62	62	61	60	60	59	58	58	57	56	56	55	54	54	53	52	51	51	50	49	48	20
21	65	65	64	63	63	62	61	60	60	59	58	58	57	56	55	55	54	53	52	52	51	21
22	69	68	67	66	66	65	64	63	63	62	61	60	60	59	58	57	57	56	55	54	53	22
23	72	71	70	69	69	68	67	66	66	65	64	63	63	62	61	60	59	58	57	57	56	23
24	75	74	73	72	72	71	70	69	68	68	67	66	65	64	63	63	62	61	60	59	58	24
25	78	77	76	75	75	74	73	72	71	70	70	69	68	67	66	65	64	63	62	62	61	25
26	81	80	79	78	78	77	76	75	74	73	72	71	71	70	69	68	67	66	65	64	63	26
27	84	83	82	81	81	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	27
28	87	86	85	84	84	83	82	81	80	79	78	77	76	75	74	73	72	71	70	69	68	28
29	90	89	88	87	87	86	85	84	83	82	81	80	79	78	77	76	75	73	72	71	70	29
30	93	93	92	91	90	89	88	87	85	84	83	82	82	80	79	78	77	76	75	74	73	30
31	97	96	95	94	93	91	90	89	88	87	86	85	84	83	82	81	80	79	77	76	75	31
32	100	99	98	97	96	94	93	92	91	90	89	88	87	86	85	83	82	81	80	79	78	32
33	103	102	101	100	98	97	96	95	94	93	92	91	90	88	87	86	85	84	82	81	80	33
34	106	105	104	103	101	100	99	98	97	96	95	93	92	91	90	89	87	86	85	84	82	34
35	109	108	107	106	104	103	102	101	100	99	97	96	95	94	92	91	90	89	87	86	85	35
36	112	111	110	109	107	106	105	104	103	101	100	99	98	96	95	94	92	91	90	89	87	36
37	115	114	113	112	110	109	108	107	105	104	103	102	101	99	98	96	95	94	92	91	90	37
38	118	117	116	115	113	112	111	110	108	107	106	104	103	102	100	99	98	96	95	94	92	38
39	122	120	119	118	116	115	114	112	111	110	108	107	106	104	103	102	100	99	97	96	95	39
40	125	123	122	121	119	118	117	115	114	113	111	110	109	107	106	104	103	101	100	98	97	40
41	128	126	125	124	122	121	120	118	117	115	114	113	111	110	108	107	105	104	102	101	99	41
42	131	130	128	127	125	124	123	121	120	118	117	115	114	112	111	109	108	106	105	103	102	42
43	134	133	131	130	128	127	125	124	123	121	120	118	117	115	114	112	110	109	107	106	104	43
44	137	136	134	133	131	130	128	127	125	124	122	121	120	118	116	115	113	111	110	108	107	44
45	140	139	137	136	134	133	131	130	128	127	125	124	122	120	119	117	116	114	112	111	109	45
46	143	142	140	139	137	136	134	133	131	130	128	126	125	123	121	120	118	117	115	113	112	46
47	146	145	143	142	140	139	137	136	134	132	131	129	128	126	124	122	121	119	117	116	114	47
48	150	148	146	145	143	142	140	138	137	135	133	132	131	128	127	125	123	122	120	118	116	48
49	153	151	149	148	146	145	143	141	140	138	136	135	133	131	129	128	126	124	122	121	119	49
50	156	154	152	151	149	148	146	144	142	141	139	137	136	134	132	130	128	127	125	123	121	50
51	159	157	156	154	152	150	149	147	145	144	142	140	139	136	135	133	131	129	127	126	124	51
52	162	160	159	157	155	153	152	150	148	146	145	143	141	139	137	135	134	132	130	128	126	52
53	165	163	162	160	158	156	155	153	151	149	147	146	144	142	140	138	136	134	132	130	128	53
54	168	167	165	163	161	159	158	156	154	152	150	148	147	144	143	141	139	137	135	133	131	54
55	171	170	168	166	164	162	160	159	157	155	153	151	150	147	145	143	141	139	137	135	133	55
56	174	173	171	169	167	165	163	162	160	158	156	154	152	150	148	146	144	142	140	138	136	56
57	178	176	174	172	170	168	166	164	162	160	159	157	155	153	151	148	146	144	142	140	138	57
58	181	179	177	175	173	171	169	167	165	163	161	159	158	155	153	151	149	147	145	143	141	58
59	184	182	180	178	176	174	172	170	168	166	164	162	160	158	156	154	152	150	147	145	143	59
60	187	185	183	181	179	177	175	173	171	169	167	165	163	161	158	156	154	152	150	148	145	60

Natural Versines.

	150°	151°	152°	153°	154°	155°	156°	157°	158°	159°	′
0	1866025	1874620	1882948	1891007	1898794	1906308	1913546	1920505	1927184	1933580	0
1	1866171	1874761	1883084	1891139	1898922	1906431	1913664	1920619	1927293	1933685	1
2	66316	74902	83221	91271	99049	06554	13782	20732	27402	33789	2
3	66461	75043	83357	91402	99176	06676	13900	20846	27510	33893	3
4	1866607	1875183	1883493	1891534	1899304	1906799	1914018	1920959	1927619	1933997	4
5	66752	75324	83630	91666	99431	06922	14136	21072	27728	34101	5
6	66897	75465	83766	91798	99558	07044	14254	21185	27836	34205	6
7	1867042	1875605	1883902	1891929	1899685	1907167	1914372	1921299	1927945	1934308	7
8	67187	75746	84038	92061	99812	07289	14490	21412	28053	34412	8
9	67331	75886	84174	92192	99939	07411	14607	21525	28161	34515	9
10	1867476	1876026	1884310	1892323	1900065	1907533	1914725	1921638	1928270	1934619	10
11	67621	76167	84445	92455	00192	07655	14842	21750	28378	34722	11
12	67766	76307	84581	92586	00319	07778	14960	21863	28486	34826	12
13	1867910	1876447	1884717	1892717	1900445	1907900	1915077	1921976	1928594	1934929	13
14	68054	76587	84852	92848	00572	08021	15194	22088	28702	35032	14
15	68199	76727	84988	92979	00698	08143	15312	22201	28810	35135	15
16	1868343	1876867	1885123	1893110	1900825	1908265	1915429	1922313	1928917	1935238	16
17	68487	77006	85258	93241	00951	08387	15546	22426	29025	35341	17
18	68632	77146	85394	93371	01077	08508	15663	22538	29133	35444	18
19	1868776	1877286	1885529	1893502	1901203	1908630	1915780	1922650	1929240	1935547	19
20	68920	77425	85664	93633	01329	08751	15896	22762	29348	35650	20
21	69064	77565	85799	93763	01455	08873	16013	22875	29455	35752	21
22	1869207	1877704	1885934	1893894	1901581	1908994	1916130	1922987	1929562	1935855	22
23	69351	77844	86069	94024	01707	09115	16246	23098	29669	35957	23
24	69495	77983	86204	94154	01833	09236	16363	23210	29777	36060	24
25	1869639	1878122	1886338	1894284	1901958	1909357	1916479	1923322	1929884	1936162	25
26	69782	78261	86473	94415	02084	09478	16596	23434	29991	36264	26
27	69926	78400	86608	94545	02209	09599	16712	23545	30097	36366	27
28	1870069	1878539	1886742	1894675	1902335	1909720	1916828	1923657	1930204	1936468	28
29	70212	78678	86877	94805	02460	09841	16944	23768	30311	36570	29
30	70356	78817	87011	94934	02585	09961	17060	23880	30418	36672	30
31	1870499	1878956	1887145	1895064	1902711	1910082	1917176	1923991	1930524	1936774	31
32	70642	79095	87279	95194	02836	10202	17292	24102	30631	36876	32
33	70785	79233	87413	95323	02961	10323	17408	24213	30737	36977	33
34	1870928	1879372	1887548	1895453	1903086	1910443	1917523	1924324	1930843	1937079	34
35	71071	79510	87682	95582	03211	10563	17639	24435	30950	37181	35
36	71214	79649	87815	95712	03335	10684	17755	24546	31056	37282	36
37	1871357	1879787	1887949	1895841	1903460	1910804	1917870	1924657	1931162	1937383	37
38	71499	79925	88083	95970	03585	10924	17986	24768	31268	37485	38
39	71642	80063	88217	96099	03709	11044	18101	24878	31374	37586	39
40	1871784	1880201	1888350	1896229	1903834	1911164	1918216	1924989	1931480	1937687	40
41	71927	80339	88484	96358	03958	11284	18331	25099	31586	37788	41
42	72069	80477	88617	96486	04083	11403	18446	25210	31691	37889	42
43	1872212	1880615	1888751	1896615	1904207	1911523	1918561	1925320	1931797	1937990	43
44	72354	80753	88884	96744	04331	11643	18676	25430	31902	38091	44
45	72496	80891	89017	96873	04455	11762	18791	25541	32008	38191	45
46	1872638	1881028	1889150	1897001	1904579	1911882	1918906	1925651	1932113	1938292	46
47	72780	81166	89283	97130	04703	12001	19021	25761	32219	38393	47
48	72922	81304	89416	97258	04827	12120	19135	25871	32324	38493	48
49	1873064	1881441	1889549	1897387	1904951	1912239	1919250	1925981	1932429	1938593	49
50	73206	81578	89682	97515	05075	12358	19364	26090	32534	38694	50
51	73347	81716	89815	97643	05198	12478	19479	26200	32639	38794	51
52	1873489	1881853	1889948	1897771	1905322	1912597	1919593	1926310	1932744	1938894	52
53	73631	81990	90080	97900	05445	12715	19707	26419	32849	38994	53
54	73772	82127	90213	98028	05569	12834	19822	26529	32954	39094	54
55	1873914	1882264	1890345	1898156	1905692	1912953	1919936	1926638	1933058	1939194	55
56	74055	82401	90478	98283	05815	13072	20050	26747	33163	39294	56
57	74196	82538	90610	98411	05939	13190	20164	26857	33267	39394	57
58	1874338	1882674	1890742	1898539	1906062	1913309	1920277	1926966	1933372	1939494	58
59	74479	82811	90874	98667	06185	13427	20391	27075	33476	39593	59
60	74620	82948	91007	98794	06308	13546	20505	27184	33580	39693	60

Parts for Seconds.

	150°		151°		152°		153°		154°		155°		156°		157°		158°		159°		160°	
"	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	"
1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1
2	5	5	5	5	5	5	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	2
3	7	7	7	7	7	7	7	6	6	6	6	6	6	6	6	6	5	5	5	5	5	3
4	10	10	9	9	9	9	9	9	9	8	8	8	8	8	8	7	7	7	7	7	7	4
5	12	12	12	12	11	11	11	11	11	10	10	10	10	10	9	9	9	9	9	8	8	5
6	15	14	14	14	14	13	13	13	13	13	12	12	12	12	11	11	11	11	10	10	10	6
7	17	17	16	16	16	16	15	15	15	15	14	14	14	14	13	13	13	12	12	12	12	7
8	19	19	19	19	18	18	18	17	17	17	16	16	16	15	15	15	15	14	14	14	13	8
9	22	21	21	21	20	20	20	19	19	19	18	18	18	17	17	17	16	16	16	15	15	9
10	24	24	24	23	23	22	22	22	21	21	20	20	20	19	19	19	18	18	17	17	17	10
11	27	26	26	25	25	25	24	24	23	23	23	22	22	21	21	20	20	20	19	19	18	11
12	29	29	28	28	27	27	26	26	25	25	25	24	24	23	23	22	22	21	21	20	20	12
13	32	31	31	30	30	29	29	28	28	27	27	26	26	25	25	24	24	23	23	22	22	13
14	34	33	33	32	32	31	31	30	30	29	29	28	28	27	27	26	25	25	24	24	23	14
15	36	36	35	35	34	34	33	32	32	31	31	30	30	29	28	28	27	27	26	25	25	15
16	39	38	38	37	36	36	35	35	34	33	33	32	32	31	30	30	29	28	28	27	27	16
17	41	41	40	39	39	38	37	37	36	35	35	34	34	33	32	32	31	30	30	29	28	17
18	44	43	42	42	41	40	40	39	38	38	37	36	35	35	34	33	33	32	31	31	30	18
19	46	45	45	44	43	43	42	41	40	40	39	38	37	37	36	35	35	34	33	32	32	19
20	48	48	47	46	46	45	44	43	42	42	41	40	39	39	38	37	36	36	35	34	33	20
21	51	50	49	49	48	47	46	45	45	44	43	42	41	41	40	39	38	37	36	36	35	21
22	53	53	52	51	50	49	48	48	47	46	45	44	43	43	42	41	40	39	38	37	36	22
23	56	55	54	53	52	51	51	50	49	48	47	46	45	44	44	43	42	41	40	39	38	23
24	58	57	56	56	55	54	53	52	51	50	49	48	47	46	45	45	44	43	42	41	40	24
25	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41	25
26	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	26
27	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	27
28	68	67	66	65	64	63	62	61	59	58	57	56	55	54	53	52	51	50	49	48	46	28
29	70	69	68	67	66	65	64	63	62	61	59	58	57	56	55	54	53	52	50	49	48	29
30	73	72	71	69	68	67	66	65	64	63	61	60	59	58	57	56	55	53	52	51	50	30
31	75	74	73	72	71	69	68	67	66	65	64	62	61	60	59	58	56	55	54	53	51	31
32	78	76	75	74	73	72	70	69	68	67	66	64	63	62	61	59	58	57	56	54	53	32
33	80	79	78	76	75	74	73	71	70	69	68	66	65	64	63	61	60	59	57	56	55	33
34	82	81	80	79	77	76	75	74	72	71	70	68	67	66	64	63	62	60	59	58	56	34
35	85	84	82	81	80	78	77	76	74	73	72	70	69	68	66	65	64	62	61	59	58	35
36	87	86	85	83	82	81	79	78	76	75	74	72	71	70	68	67	65	64	63	61	60	36
37	90	88	87	86	84	83	81	80	79	77	76	74	73	72	70	69	67	66	64	63	61	37
38	92	91	89	88	86	85	84	82	81	79	78	76	75	73	72	70	69	68	66	65	63	38
39	95	93	92	90	89	87	86	84	83	81	80	78	77	75	74	72	71	69	68	66	65	39
40	97	95	94	93	91	90	88	87	85	83	82	80	79	77	76	74	73	71	70	68	66	40
41	99	98	96	95	93	92	90	89	87	86	84	82	81	79	78	76	74	73	71	70	68	41
42	102	100	99	97	96	94	92	91	89	88	86	84	83	81	80	78	76	75	73	71	70	42
43	104	103	101	99	98	96	95	93	91	90	88	86	85	83	81	80	78	76	74	73	71	43
44	107	105	103	102	100	98	97	95	93	92	90	88	87	85	83	82	80	78	76	75	73	44
45	109	107	106	104	102	101	99	97	96	94	92	90	89	87	85	83	82	80	78	76	75	45
46	112	110	108	106	105	103	101	100	98	96	94	92	91	89	87	85	84	82	80	78	76	46
47	114	112	110	109	107	105	103	102	100	98	96	95	93	91	89	87	85	84	82	80	78	47
48	116	115	113	111	109	107	106	104	102	100	98	97	95	93	91	89	87	85	83	81	80	48
49	119	117	115	113	112	110	108	106	104	102	100	99	97	95	93	91	89	87	85	83	81	49
50	121	119	118	116	114	112	110	108	106	104	102	101	99	97	95	93	91	89	87	85	83	50
51	124	122	120	118	116	114	112	110	108	106	105	103	101	99	97	95	93	91	89	87	85	51
52	126	124	122	120	118	116	114	112	110	109	107	105	103	101	98	96	94	92	90	88	86	52
53	128	127	125	123	121	119	117	115	113	111	109	107	105	102	100	98	96	94	92	90	88	53
54	131	129	127	125	123	121	119	117	115	113	111	109	106	104	102	100	98	96	94	92	90	54
55	133	131	129	127	125	123	121	119	117	115	113	111	108	106	104	102	100	98	96	93	91	55
56	136	134	132	130	127	125	123	121	119	117	115	113	110	108	106	104	102	99	97	95	93	56
57	138	136	134	132	130	128	125	123	121	119	117	115	112	110	108	106	104	101	99	97	95	57
58	141	138	136	134	132	130	128	125	123	121	119	117	114	112	110	108	105	103	101	98	96	58
59	143	141	139	137	134	131	130	128	125	123	121	119	116	114	112	109	107	105	103	100	98	59
60	145	143	141	139	136	134	132	130	127	125	123	121	118	116	114	111	109	107	104	102	99	60

Natural Versines.

′	160°	161°	162°	163°	164°	165°	166°	167°	168°	169°	′
0	1939693	1945519	1951057	1956305	1961262	1965926	1970296	1974370	1978148	1981627	0
1	1939792	1945613	1951146	1956390	1961342	1966001	1970366	1974436	1978208	1981683	1
2	39891	45708	51236	56475	61422	66076	70436	74501	78268	81738	2
3	39991	45802	51326	56560	61502	66151	70507	74566	78329	81793	3
4	1940090	1945897	1951415	1956644	1961582	1966226	1970577	1974631	1978389	1981849	4
5	40189	45991	51505	56729	61662	66301	70647	74696	78449	81904	5
6	40288	46085	51594	56814	61741	66376	70717	74761	78509	81959	6
7	1940387	1946180	1951684	1956898	1961821	1966451	1970786	1974826	1978569	1982014	7
8	40486	46274	51773	56983	61901	66526	70856	74891	78629	82069	8
9	40585	46368	51862	57067	61980	66600	70926	74956	78689	82123	9
10	1940684	1946462	1951951	1957151	1962059	1966675	1970995	1975020	1978748	1982178	10
11	40782	46556	52040	57235	62139	66749	71065	75085	78808	82233	11
12	40881	46649	52129	57320	62218	66823	71134	75149	78867	82287	12
13	1940979	1946743	1952218	1957404	1962297	1966898	1971204	1975214	1978927	1982342	13
14	41078	46837	52307	57488	62376	66972	71273	75278	78986	82396	14
15	41176	46930	52396	57571	62455	67046	71342	75342	79046	82450	15
16	1941274	1947024	1952484	1957655	1962534	1967120	1971411	1975407	1979105	1982505	16
17	41372	47117	52573	57739	62613	67194	71480	75471	79164	82559	17
18	41471	47210	52662	57823	62692	67268	71549	75535	79223	82613	18
19	1941569	1947304	1952750	1957906	1962770	1967342	1971618	1975599	1979282	1982667	19
20	41667	47397	52838	57990	62849	67415	71687	75662	79341	82721	20
21	41764	47490	52926	58073	62928	67489	71755	75726	79399	82774	21
22	1941862	1947583	1953015	1958156	1963006	1967562	1971824	1975790	1979458	1982828	22
23	41960	47676	53103	58239	63084	67636	71893	75853	79517	82882	23
24	42058	47768	53191	58323	63163	67709	71961	75917	79575	82935	24
25	1942155	1947861	1953279	1958406	1963241	1967783	1972029	1975980	1979634	1982989	25
26	42253	47954	53366	58489	63319	67856	72098	76044	79692	83042	26
27	42350	48046	53454	58572	63397	67929	72166	76107	79750	83096	27
28	1942447	1948139	1953542	1958654	1963475	1968002	1972234	1976170	1979809	1983149	28
29	42544	48231	53629	58737	63553	68075	72302	76233	79867	83202	29
30	42642	48324	53717	58820	63631	68148	72370	76296	79925	83255	30
31	1942739	1948416	1953804	1958902	1963708	1968220	1972438	1976359	1979983	1983308	31
32	42836	48508	53892	58985	63786	68293	72506	76422	80041	83361	32
33	42932	48600	53979	59067	63863	68366	72573	76485	80098	83414	33
34	1943029	1948692	1954066	1959150	1963941	1968438	1972641	1976547	1980156	1983466	34
35	43126	48784	54153	59232	64018	68511	72708	76610	80214	83519	35
36	43223	48876	54240	59314	64095	68583	72776	76672	80271	83572	36
37	1943319	1948968	1954327	1959396	1964173	1968656	1972843	1976735	1980329	1983624	37
38	43416	49060	54414	59478	64250	68728	72911	76797	80386	83676	38
39	43512	49151	54501	59560	64327	68800	72978	76859	80443	83729	39
40	1943609	1949243	1954588	1959642	1964404	1968872	1973045	1976922	1980501	1983781	40
41	43705	49334	54674	59724	64481	68944	73112	76984	80558	83833	41
42	43801	49426	54761	59805	64557	69016	73179	77046	80615	83885	42
43	1943897	1949517	1954847	1959887	1964634	1969088	1973246	1977108	1980672	1983937	43
44	43993	49608	54934	59968	64711	69159	73313	77169	80729	83989	44
45	44089	49699	55020	60050	64787	69231	73379	77231	80785	84041	45
46	1944185	1949790	1955106	1960131	1964864	1969302	1973446	1977293	1980842	1984092	46
47	44281	49881	55192	60213	64940	69374	73512	77354	80899	84144	47
48	44376	49972	55278	60294	65016	69445	73579	77416	80955	84196	48
49	1944472	1950063	1955364	1960375	1965093	1969517	1973645	1977477	1981012	1984247	49
50	44568	50154	55450	60456	65169	69588	73712	77539	81068	84299	50
51	44663	50244	55536	60537	65245	69659	73778	77600	81124	84350	51
52	1944758	1950335	1955622	1960618	1965321	1969730	1973844	1977661	1981181	1984401	52
53	44854	50425	55707	60698	65397	69801	73910	77722	81237	84452	53
54	44949	50516	55793	60779	65473	69872	73976	77783	81293	84503	54
55	1945044	1950606	1955879	1960860	1965548	1969943	1974042	1977844	1981349	1984554	55
56	45139	50696	55964	60940	65624	70014	74108	77905	81405	84605	56
57	45234	50787	56049	61021	65700	70084	74173	77966	81460	84656	57
58	1945329	.950877	1956135	1961101	1965775	1970155	1974239	1978026	1981516	1984707	58
59	45424	50967	56220	61182	65850	70225	74305	78087	81572	84757	59
60	45519	51057	56305	61262	65926	70296	74370	78148	81627	84808	60

Parts for Seconds.

	160°		161°		162°		163°		164°		165°		166°		167°		168°		169°		170°	
"	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	"
1	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2
3	5	5	5	5	4	4	4	4	4	4	4	4	4	3	3	3	3	3	3	3	3	3
4	7	6	6	6	6	6	6	6	5	5	5	5	5	5	4	4	4	4	4	4	3	4
5	8	8	8	8	7	7	7	7	7	6	6	6	6	6	5	5	5	5	5	4	4	5
6	10	10	9	9	9	9	9	8	8	8	8	7	7	7	7	6	6	6	6	5	5	6
7	12	11	11	11	10	10	10	10	9	9	9	8	8	8	8	7	7	7	6	6	6	7
8	13	13	13	12	12	12	11	11	11	10	10	10	9	9	9	8	8	8	7	7	7	8
9	15	15	14	14	13	13	13	12	12	11	11	11	11	10	10	9	9	9	8	8	8	9
10	17	16	16	15	15	15	14	14	13	13	13	12	12	11	11	10	10	10	9	9	8	10
11	18	18	17	17	16	16	16	15	15	14	14	13	13	12	12	12	11	11	10	10	9	11
12	20	19	19	18	18	17	17	17	16	16	15	15	14	14	13	13	12	12	11	11	10	12
13	22	21	21	20	19	19	18	18	17	17	16	16	15	15	14	14	13	13	12	11	11	13
14	23	23	22	22	21	20	20	19	19	18	18	17	16	16	15	15	14	14	13	12	12	14
15	25	24	24	23	22	22	21	21	20	19	19	18	18	17	16	16	15	15	14	13	13	15
16	27	26	25	25	24	23	23	22	21	21	20	19	19	18	17	17	16	15	15	14	13	16
17	28	28	27	26	25	25	24	23	23	22	21	21	20	19	19	18	17	16	16	15	14	17
18	30	29	28	28	27	26	26	25	24	23	23	22	21	20	20	19	18	17	17	16	15	18
19	32	31	30	29	28	28	27	26	25	25	24	23	22	22	21	20	19	18	18	17	16	19
20	33	32	32	31	30	29	28	28	27	26	25	24	23	23	22	21	20	19	19	18	17	20
21	35	34	33	32	31	31	30	29	28	27	26	25	25	24	23	22	21	20	19	19	18	21
22	36	36	35	34	33	32	31	30	29	28	28	27	26	25	24	23	22	21	20	19	19	22
23	38	37	36	35	34	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	19	23
24	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	20	24
25	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21	25
26	43	42	41	40	39	38	37	36	35	34	33	32	31	29	28	27	26	25	24	23	22	26
27	45	44	43	42	41	39	38	37	36	35	34	33	32	31	29	28	27	26	25	24	23	27
28	46	45	44	43	42	41	40	39	37	36	35	34	33	32	31	29	28	27	26	25	24	28
29	48	47	46	45	43	42	41	40	39	38	36	35	34	33	32	30	29	28	27	26	24	29
30	50	49	47	46	45	44	43	41	40	39	38	36	35	34	33	31	30	29	28	27	25	30
31	51	50	49	48	46	45	44	43	41	40	39	38	36	35	34	33	31	30	29	27	26	31
32	53	52	51	49	48	47	45	44	43	41	40	39	38	36	35	34	32	31	30	28	27	32
33	55	53	52	51	49	48	47	45	44	43	41	40	39	37	36	35	33	32	31	29	28	33
34	56	55	54	52	51	50	48	47	45	44	43	41	40	38	37	36	34	33	31	30	29	34
35	58	57	55	54	52	51	50	48	47	45	44	42	41	40	38	37	35	34	32	31	29	35
36	60	58	57	55	54	52	51	50	48	47	45	44	42	41	39	38	36	35	33	32	30	36
37	61	60	58	57	55	54	52	51	49	48	46	45	43	42	40	39	37	36	34	33	31	37
38	63	61	60	58	57	55	54	52	51	49	48	46	45	43	41	40	38	37	35	34	32	38
39	65	63	62	60	58	57	55	54	52	50	49	47	46	44	43	41	39	38	36	34	33	39
40	66	65	63	62	60	58	57	55	53	52	50	49	47	45	44	42	40	39	37	35	34	40
41	68	66	65	63	61	60	58	56	55	53	51	50	48	46	45	43	41	40	38	36	35	41
42	70	68	66	65	63	61	60	58	56	54	53	51	49	48	46	44	42	41	39	37	35	42
43	71	70	68	66	65	63	61	59	57	56	54	52	50	49	47	45	43	42	40	38	36	43
44	73	71	69	68	66	64	62	61	59	57	55	53	52	50	48	46	44	43	41	39	37	44
45	75	73	71	69	67	66	64	62	60	58	56	55	53	51	49	47	45	44	42	40	38	45
46	76	74	73	71	69	67	65	63	61	60	58	56	54	52	50	48	46	44	43	41	39	46
47	78	76	74	72	70	69	67	65	63	61	59	57	55	53	51	49	47	45	43	42	40	47
48	80	78	76	74	72	70	68	66	64	62	60	58	56	54	52	50	48	46	44	42	40	48
49	81	79	77	75	73	71	69	68	65	63	61	59	57	55	53	51	49	47	45	43	41	49
50	83	80	79	77	75	73	71	69	67	65	63	61	59	57	55	52	50	48	46	44	42	50
51	85	83	80	78	76	74	72	70	68	66	64	62	60	58	56	54	51	49	46	45	43	51
52	86	84	82	80	78	76	74	72	69	67	65	63	61	59	57	55	52	50	48	46	44	52
53	88	86	84	82	79	77	75	73	71	69	67	64	62	60	58	56	53	51	48	47	45	53
54	90	87	85	83	80	79	77	74	72	70	68	66	63	61	59	57	54	52	50	48	45	54
55	91	89	87	85	82	80	78	76	73	71	69	67	65	62	60	58	55	53	51	49	46	55
56	93	91	88	86	84	82	79	77	74	72	70	68	66	63	61	59	56	54	51	49	47	56
57	95	92	90	88	85	83	81	78	76	74	72	69	67	65	62	60	57	55	52	50	48	57
58	96	94	92	89	87	85	82	80	77	75	73	70	68	66	63	61	58	56	53	51	49	58
59	98	95	93	91	88	86	84	81	79	76	74	72	69	67	64	62	59	57	54	52	50	59
60	99	97	95	92	90	87	85	83	80	78	75	73	70	68	65	63	60	58	55	53	50	60

Natural Versines.

′	170°	171°	172°	173°	174°	175°	176°	177°	178°	179°	′
0	1984806	1987688	1990268	1992546	1994522	1996195	1997564	1998630	1999391	1999848	0
1	1984858	1987734	1990309	1992582	1994552	1996220	1997584	1998645	1999401	1999853	1
2	84909	87779	90349	92617	94583	96245	97605	98660	99411	99858	2
3	84959	87825	90389	92652	94613	96270	97625	98675	99421	99863	3
4	1985009	1987870	1990429	1992687	1994643	1996295	1997645	1998690	1999431	1999867	4
5	85059	87915	90469	92722	94673	96320	97665	98705	99441	99872	5
6	85109	87960	90510	92757	94703	96345	97684	98719	99450	99877	6
7	1985159	1988005	1990549	1992792	1994733	1996370	1997704	1998734	1999460	1999881	7
8	85209	88050	90589	92827	94763	96395	97724	98749	99469	99886	8
9	85259	88095	90629	92862	94792	96420	97743	98763	99479	99890	9
10	1985309	1988139	1990669	1992896	1994822	1996444	1997763	1998778	1999488	1999894	10
11	85358	88184	90708	92931	94851	96469	97782	98792	99497	99898	11
12	85408	88228	90748	92966	94881	96493	97802	98806	99507	99903	12
13	1985457	1988273	1990787	1993000	1994910	1996517	1997821	1998820	1999516	1999907	13
14	85507	88317	90827	93034	94939	96541	97840	98834	99525	99911	14
15	85556	88362	90866	93069	94969	96566	97859	98848	99534	99914	15
16	1985605	1988406	1990905	1993103	1994998	1996590	1997878	1998862	1999542	1999918	16
17	85654	88450	90944	93137	95027	96614	97897	98876	99551	99922	17
18	85704	88494	90983	93171	95056	96637	97916	98890	99560	99925	18
19	1985752	1988538	1991022	1993205	1995084	1996661	1997934	1998904	1999568	1999929	19
20	85801	88582	91061	93238	95113	96685	97953	98917	99577	99932	20
21	85850	88626	91100	93272	95142	96709	97972	98931	99585	99936	21
22	1985899	1988669	1991138	1993306	1995171	1996732	1997990	1998944	1999594	1999939	22
23	85948	88713	91177	93339	95199	96756	98008	98957	99602	99942	23
24	85996	88756	91216	93373	95227	96779	98027	98971	99610	99945	24
25	1986045	1988800	1991254	1993406	1995256	1996802	1998045	1998984	1999618	1999948	25
26	86093	88843	91292	93440	95284	96825	98063	98997	99626	99951	26
27	86141	88887	91331	93473	95312	96849	98081	99010	99634	99954	27
28	1986189	1988930	1991369	1993506	1995340	1996872	1998099	1999023	1999642	1999957	28
29	86238	88973	91407	93539	95368	96895	98117	99036	99650	99959	29
30	86286	89016	91445	93572	95396	96917	98135	99048	99657	99962	30
31	1986334	1989059	1991483	1993605	1995424	1996940	1998153	1999061	1999665	1999964	31
32	86382	89102	91521	93638	95452	96963	98170	99073	99672	99967	32
33	86429	89145	91558	93670	95480	96985	98188	99086	99680	99969	33
34	1986477	1989187	1991596	1993703	1995507	1997008	1998205	1999098	1999687	1999971	34
35	86525	89230	91634	93736	95535	97030	98223	99111	99694	99974	35
36	86572	89272	91671	93768	95562	97053	98240	99123	99702	99976	36
37	1986620	1989315	1991709	1993800	1995589	1997075	1998257	1999135	1999709	1999978	37
38	86667	89357	91746	93833	95617	97097	98274	99147	99716	99980	38
39	86714	89399	91783	93865	95644	97119	98291	99159	99722	99981	39
40	1986762	1989442	1991820	1993897	1995671	1997141	1998308	1999171	1999729	1999983	40
41	86809	89484	91857	93929	95698	97163	98325	99183	99736	99985	41
42	86856	89526	91894	93961	95725	97185	98342	99194	99743	99986	42
43	1986903	1989568	1991931	1993993	1995752	1997207	1998359	1999206	1999749	1999988	43
44	86950	89610	91968	94025	95778	97229	98375	99218	99756	99989	44
45	86996	89651	92005	94056	95805	97250	98392	99229	99762	99991	45
46	1987043	1989693	1992042	1994088	1995832	1997272	1998408	1999240	1999768	1999992	46
47	87090	89735	92078	94120	95858	97293	98425	99252	99775	99993	47
48	87136	89776	92115	94151	95884	97315	98441	99263	99781	99994	48
49	1987183	1989818	1992151	1994182	1995911	1997336	1998457	1999274	1999787	1999995	49
50	87229	89859	92187	94214	95937	97357	98473	99285	99793	99996	50
51	87275	89900	92224	94245	95963	97378	98489	99296	99799	99997	51
52	1987322	1989942	1992260	1994276	1995989	1997399	1998505	1999307	1999804	1999997	52
53	87368	89983	92296	94307	96015	97420	98521	99318	99810	99998	53
54	87414	90024	92332	94338	96041	97441	98537	99328	99816	99999	54
55	1987460	1990065	1992368	1994369	1996067	1997462	1998552	1999339	1999821	1999999	55
56	87506	90106	92404	94400	96093	97482	98568	99350	99827	99999	56
57	87551	90146	92439	94430	96118	97503	98584	99360	99832	2000000	57
58	1987597	1990187	1992475	1994461	1996144	1997523	1998599	1999370	1999837	2000000	58
59	87643	90228	92511	94491	96169	97544	98614	99381	99843	00000	59
60	87688	90268	92546	94522	96195	97564	98636	99391	99848	00000	60

Parts for Seconds.

	170°		171°		172°		173°		174°		175°		176°		177°		178°		179°		180°	
"	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	30′	0′	"
1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	2
3	3	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	0	0	0	0	0	3
4	3	3	3	3	3	2	2	2	2	2	2	1	1	1	1	1	1	0	0	0	0	4
5	4	4	4	4	3	3	3	3	2	2	2	2	2	1	1	1	1	1	0	0	0	5
6	5	5	4	4	4	4	3	3	3	3	2	2	2	2	1	1	1	1	0	0	0	6
7	6	6	5	5	5	4	4	4	3	3	3	3	2	2	2	1	1	1	1	0	0	7
8	7	6	6	6	5	5	5	4	4	4	3	3	3	2	2	2	1	1	1	0	0	8
9	8	7	7	6	6	6	5	5	4	4	4	3	3	3	2	2	1	1	1	0	0	9
10	8	8	8	7	7	6	6	5	5	5	4	4	3	3	2	2	2	1	1	0	0	10
11	9	9	8	8	7	7	6	6	6	5	5	4	4	3	3	2	2	1	1	0	0	11
12	10	10	9	9	8	8	7	7	6	6	5	5	4	3	3	2	2	1	1	0	0	12
13	11	10	10	9	9	8	8	7	7	6	5	5	4	4	3	3	2	2	1	0	0	13
14	12	11	11	10	9	9	8	8	7	6	6	5	5	4	3	3	2	2	1	0	0	14
15	13	12	11	11	10	9	9	8	8	7	6	6	5	4	4	3	2	2	1	1	0	15
16	13	13	12	11	11	10	9	9	8	7	7	6	5	5	4	3	3	2	1	1	0	16
17	14	14	13	12	11	11	10	9	9	8	7	6	6	5	4	4	3	2	1	1	0	17
18	15	14	14	13	12	11	11	10	9	8	8	7	6	5	5	4	3	2	1	1	0	18
19	16	15	14	14	13	12	11	10	10	9	8	7	6	6	5	4	3	2	2	1	0	19
20	17	16	15	14	13	13	12	11	10	9	8	8	7	6	5	4	3	2	2	1	0	20
21	18	17	16	15	14	13	12	11	11	10	9	8	7	6	5	4	3	3	2	1	0	21
22	19	18	17	16	15	14	13	12	11	10	9	8	7	6	6	5	4	3	2	1	0	22
23	19	18	17	16	15	14	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	23
24	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	24
25	21	20	19	18	17	16	15	14	13	12	11	9	8	7	6	5	4	3	2	1	0	25
26	22	21	20	19	17	16	15	14	13	12	11	10	9	8	7	5	4	3	2	1	0	26
27	23	22	20	19	18	17	16	15	14	12	11	10	9	8	7	6	5	3	2	1	0	27
28	24	22	21	20	19	18	16	15	14	13	12	11	9	8	7	6	5	3	2	1	0	28
29	24	23	22	21	19	18	17	16	15	13	12	11	10	9	7	6	5	4	2	1	0	29
30	25	24	23	21	20	19	18	16	15	14	13	11	10	9	8	6	5	4	2	1	0	30
31	26	25	23	22	21	20	18	17	16	14	13	12	10	9	8	7	5	4	3	1	0	31
32	27	26	24	23	22	20	19	17	16	15	13	12	11	9	8	7	5	4	3	1	0	32
33	28	26	25	24	22	21	19	18	17	15	14	12	11	10	8	7	6	4	3	1	0	33
34	29	27	26	24	23	21	20	19	17	16	14	13	11	10	9	7	6	4	3	1	0	34
35	29	28	26	25	24	22	21	19	18	16	15	13	12	10	9	7	6	4	3	1	0	35
36	30	29	27	26	24	23	21	20	18	17	15	14	12	11	9	8	6	5	3	1	0	36
37	31	30	28	26	25	23	22	20	19	17	16	14	12	11	9	8	6	5	3	1	0	37
38	32	30	29	27	26	24	22	21	19	18	16	14	13	11	10	8	6	5	3	2	0	38
39	33	31	30	28	26	25	23	21	20	18	16	15	13	11	10	8	7	5	3	2	0	39
40	34	32	30	29	27	25	24	22	20	18	17	15	13	12	10	8	7	5	3	2	0	40
41	35	33	31	29	28	26	24	22	21	19	17	16	14	12	10	9	7	5	3	2	0	41
42	35	34	32	30	28	27	25	23	21	19	18	16	14	12	11	9	7	5	3	2	0	42
43	36	34	33	31	29	27	25	24	22	20	18	16	14	13	11	9	7	5	4	2	0	43
44	37	35	33	31	30	28	26	24	22	20	19	17	15	13	11	9	7	6	4	2	0	44
45	38	36	34	32	30	28	27	25	23	21	19	17	15	13	11	9	8	6	4	2	0	45
46	39	37	35	33	31	29	27	25	23	21	19	17	16	14	12	10	8	6	4	2	0	46
47	40	38	36	34	32	30	28	26	24	22	20	18	16	14	12	10	8	6	4	2	0	47
48	40	38	36	34	32	30	28	26	24	22	20	18	16	14	12	10	8	6	4	2	0	48
49	41	39	37	35	33	31	29	27	25	23	21	19	16	14	12	10	8	6	4	2	0	49
50	42	40	38	36	34	32	29	27	25	23	21	19	17	15	13	10	8	6	4	2	0	50
51	43	41	39	36	34	32	30	28	26	24	21	19	17	15	13	11	9	6	4	2	0	51
52	44	42	39	37	35	33	31	28	26	24	22	20	18	15	13	11	9	7	4	2	0	52
53	45	42	40	38	36	33	31	29	27	25	22	20	18	16	13	11	9	7	4	2	0	53
54	45	43	41	39	36	34	32	30	27	25	23	20	18	16	14	11	9	7	4	2	0	54
55	46	44	42	39	37	35	32	30	28	25	23	21	19	16	14	12	9	7	5	2	0	55
56	47	45	42	40	38	35	33	31	28	26	24	21	19	17	14	12	9	7	5	2	0	56
57	48	46	43	41	38	36	34	31	29	26	24	22	19	17	14	12	10	7	5	2	0	57
58	49	46	44	42	39	37	34	32	29	27	24	22	20	17	15	12	10	7	5	2	0	58
59	50	47	45	42	40	37	35	32	30	27	25	22	20	17	15	12	10	7	5	2	0	59
60	50	48	45	43	40	38	35	33	30	28	25	23	20	18	15	13	10	8	5	2	0	60

Bearing Amplitude and Time Amplitude at Rising and Setting of the Sun.

Declination.

Lat.	1°		2°		3°		4°		5°		6°	
	Bearing Ampl.	Time Ampl.	Bearing Ampl.	Time Ampl.	Bearg. Ampl.	Time Ampl.	Bearg. Ampl.	Time Ampl.	Bearg. Ampl.	Time Ampl.	Bearg. Ampl.	Time Ampl.
°	° ′	h. m.	° ′	h. m.	° ′	h. m.	° ′	h. m.	° ′	h. m.	° ′	h. m.
1	1. 0	0. 0	2. 0	0. 0	3. 0	0. 0	4. 0	0. 0	5. 0	0. 0	6. 0	0. 0
2	1. 0	0. 0	2. 0	0. 0	3. 0	0. 0	4. 0	0. 1	5. 0	0. 1	6. 0	0. 1
3	1. 0	0. 0	2. 0	0. 0	3. 0	0. 1	4. 0	0. 1	5. 0	0. 1	6. 0	0. 1
4	1. 0	0. 0	2. 0	0. 1	3. 0	0. 1	4. 1	0. 1	5. 1	0. 1	6. 1	0. 2
5	1. 0	0. 0	2. 0	0. 1	3. 0	0. 1	4. 1	0. 1	5. 1	0. 2	6. 1	0. 2
6	1. 0	0. 0	2. 0	0. 1	3. 1	0. 1	4. 1	0. 2	5. 1	0. 2	6. 2	0. 3
7	1. 0	0. 0	2. 1	0. 1	3. 1	0. 1	4. 2	0. 2	5. 2	0. 2	6. 3	0. 3
8	1. 0	0. 1	2. 1	0. 1	3. 2	0. 2	4. 3	0. 2	5. 3	0. 3	6. 4	0. 3
9	1. 0	0. 1	2. 1	0. 1	3. 2	0. 2	4. 3	0. 3	5. 3	0. 3	6. 5	0. 4
10	1. 1	0. 1	2. 2	0. 1	3. 3	0. 2	4. 4	0. 3	5. 5	0. 4	6. 6	0. 4
11	1. 1	0. 1	2. 2	0. 2	3. 3	0. 2	4. 4	0. 3	5. 6	0. 4	6. 7	0. 5
12	1. 1	0. 1	2. 3	0. 2	3. 4	0. 3	4. 5	0. 3	5. 7	0. 4	6. 8	0. 5
13	1. 2	0. 1	2. 3	0. 2	3. 5	0. 3	4. 6	0. 4	5. 8	0. 5	6.10	0. 6
14	1. 2	0. 1	2. 3	0. 2	3. 5	0. 3	4. 7	0. 4	5. 9	0 5	6 11	0. 6
15	1. 2	0. 1	2. 4	0. 2	3. 6	0. 3	4. 8	0 4	5.11	0. 5	6.13	0. 6
16	1. 3	0. 1	2. 5	0. 2	3. 7	0. 3	4.10	0. 5	5.12	0. 6	6.14	0. 7
17	1. 3	0. 1	2. 5	0. 2	3. 8	0. 4	4.11	0. 5	5.13	0. 6	6.16	0. 7
18	1. 3	0. 1	2. 6	0. 3	3. 9	0. 4	4.12	0. 5	5.15	0. 7	6.19	0. 8
19	1. 3	0. 1	2. 7	0. 3	3.10	0. 4	4.14	0. 6	5.17	0. 7	6.21	0. 8
20	1. 4	0. 1	2. 8	0. 3	3.12	0. 4	4.16	0. 6	5.19	0. 7	6.23	0. 9
21	1. 4	0. 2	2. 9	0. 3	3.13	0. 5	4.17	0. 6	5.21	0. 8	6.25	0. 9
22	1. 5	0. 2	2.10	0. 3	3.14	0. 5	4.19	0. 6	5.24	0. 8	6.28	0.10
23	1. 5	0. 2	2.11	0. 3	3.15	0. 5	4.21	0. 7	5.26	0. 9	6.31	0.10
24	1. 6	0. 2	2.12	0. 4	3.17	0. 5	4.23	0. 7	5.29	0. 9	6.34	0.11
25	1. 6	0. 2	2.13	0. 4	3.19	0. 6	4.25	0. 7	5.31	0. 9	6.37	0.11
26	1. 7	0. 2	2.14	0. 4	3.21	0. 6	4.27	0. 8	5.34	0.10	6.41	0.12
27	1. 7	0. 2	2.15	0. 4	3.22	0. 6	4.29	0. 8	5.37	0.10	6.44	0.12
28	1. 8	0. 2	2.16	0. 4	3.24	0. 6	4.32	0. 9	5.40	0.11	6.48	0.13
29	1. 9	0. 2	2.17	0. 4	3.26	0. 7	4.34	0. 9	5.43	0 11	6.52	0.13
30	1.10	0. 2	2.19	0. 5	3.28	0. 7	4.37	0. 9	5.47	0.12	6.56	0.14
31	1.10	0. 2	2.20	0. 5	3.30	0. 7	4.40	0.10	5.50	0.12	7. 0	0.14
32	1.11	0. 2	2.22	0. 5	3.33	0. 7	4.43	0.10	5.54	0.13	7. 5	0.15
33	1.11	0. 3	2.23	0. 5	3.35	0. 8	4.46	0.10	5.58	0.13	7.10	0.16
34	1.12	0. 3	2.25	0. 5	3.37	0. 8	4.50	0.11	6. 2	0.14	7.15	0.16
35	1.13	0. 3	2.27	0. 6	3.40	0. 8	4.53	0.11	6 6	0.14	7.20	0.17
36	1.14	0. 3	2.28	0. 6	3.43	0. 9	4 57	0.12	6.11	0.15	7.25	0.18
37	1.15	0. 3	2.30	0 6	3.45	0. 9	5. 1	0.12	6.16	0.15	7.31	0.18
38	1.16	0. 3	2.32	0. 6	3.48	0. 9	5. 5	0.13	6.21	0.16	7.37	0.19
39	1.17	0. 3	2.34	0. 6	3.52	0.10	5. 9	0.13	6.26	0.16	7.44	0.20
40	1.18	0. 3	2.37	0. 7	3.55	0.10	5.14	0.13	6.32	0.17	7.51	0.20
41	1.19	0. 3	2.39	0. 7	3.59	0.10	5.18	0.14	6.38	0.17	7.58	0.21
42	1.21	0. 4	2.41	0. 7	4. 2	0.11	5.23	0.14	6.44	0.18	8. 5	0.22
43	1.22	0. 4	2.44	0. 7	4. 6	0.11	5.28	0.15	6.51	0.19	8.13	0.22
44	1.23	0. 4	2.47	0. 8	4.10	0.12	5.34	0.15	6.58	0.19	8.21	0.23
45	1.25	0. 4	2.50	0. 8	4.15	0.12	5.40	0.16	7. 5	0.20	8.30	0.24
46	1.26	0. 4	2.53	0. 8	4.19	0.12	5.46	0.17	7.12	0.21	8.39	0.25
47	1.28	0. 4	2.56	0. 9	4.24	0.13	5.52	0.17	7.21	0.22	8.49	0.26
48	1.30	0. 4	2.59	0. 9	4.29	0.13	5.59	0.18	7.29	0.22	8.59	0.27
49	1.31	0. 5	3. 3	0. 9	4.35	0.14	6. 6	0.18	7.38	0.23	9.10	0.28
50	1.33	0. 5	3. 7	0.10	4.40	0.14	6.14	0.19	7.48	0.24	9.21	0.29
51	1.35	0. 5	3.11	0.10	4.46	0.15	6.22	0.20	7.58	0.25	9.34	0.30
52	1.37	0. 5	3.15	0.10	4.52	0.15	6.30	0.21	8. 8	0.26	9.46	0.31
53	1.39	0. 5	3.20	0.11	4.59	0.16	6.40	0.21	8.20	0.27	10. 0	0.32
54	1.42	0. 5	3.24	0.11	5. 7	0.16	6.49	0.22	8.32	0.28	10.15	0.33
55	1.45	0. 6	3.29	0.11	5.14	0.17	6.59	0.23	8.44	0.29	10.30	0.35
56	1.47	0. 6	3.35	0.12	5.22	0.18	7.10	0.24	8.58	0.30	10.46	0.36
57	1.50	0. 6	3.41	0.12	5.31	0.19	7.22	0.25	9.13	0.31	11. 4	0.37
58	1.52	0. 6	3.47	0.13	5.40	0.19	7.34	0.26	9.28	0.32	11.22	0.39
59	1.57	0. 7	3.53	0.13	5.50	0.20	7.47	0.27	9.45	0.33	11.43	0.40
60	2. 0	0. 7	4. 0	0.14	6. 0	0.21	8. 1	0.28	10. 2	0.35	12. 4	0.42
61	2. 4	0. 7	4. 8	0.14	6.12	0.22	8.16	0.29	10.21	0.36	12.27	0.44
62	2. 8	0. 8	4.16	0.15	6.24	0.23	8.33	0.30	10.42	0.38	12.52	0.46
63	2.12	0. 8	4.25	0.16	6.37	0.24	8.50	0.32	11. 4	0.40	13.19	0.48
64	2.17	0. 8	4.34	0.16	6.51	0.25	9. 9	0.33	11.28	0.41	13.48	0.50

Bearing Amplitude and Time Amplitude at Rising and Setting of the Sun.

Declination.

Lat.	7°		8°		9°		10°		11°		12°	
	Bearing Ampl.	Time Ampl.	Bearing Ampl.	Time Ampl.	Bearg. Ampl.	Time Ampl.	Bearg. Ampl.	Time Ampl.	Bearg. Ampl.	Time Ampl.	Bearg. Ampl.	Time Ampl.
°	° ′	h. m.	° ′	h. m.	° ′	h. m.	° ′	h. m.	° ′	h. m.	° ′	h. m.
1	7. 0	0. 0	8. 0	0. 1	9. 0	0. 1	10. 0	0. 1	11. 0	0. 1	12. 0	0. 1
2	7. 0	0. 1	8. 0	0. 1	9. 0	0. 1	10. 0	0. 1	11. 0	0. 2	12. 0	0. 2
3	7. 1	0. 1	8. 1	0. 2	9. 1	0. 2	10. 1	0. 2	11. 1	0. 2	12. 1	0. 3
4	7. 1	0. 2	8. 1	0. 2	9. 1	0. 3	10. 2	0. 3	11. 2	0. 3	12. 2	0. 3
5	7. 2	0. 2	8. 2	0. 3	9. 2	0. 3	10. 3	0. 4	11. 3	0. 4	12. 3	0. 4
6	7. 3	0. 3	8. 3	0. 3	9. 3	0. 4	10. 4	0. 4	11. 4	0. 5	12. 4	0. 5
7	7. 4	0. 3	8. 4	0. 4	9. 4	0. 4	10. 5	0. 5	11. 5	0. 5	12. 5	0. 6
8	7. 5	0. 4	8. 5	0. 5	9. 5	0. 5	10. 6	0. 6	11. 7	0. 6	12. 7	0. 7
9	7. 5	0. 4	8. 6	0. 5	9. 7	0. 6	10. 8	0. 6	11. 8	0. 6	12. 9	0. 8
10	7. 7	0. 5	8. 8	0. 6	9. 9	0. 6	10.10	0. 7	11.11	0. 8	12.12	0. 9
11	7. 9	0. 5	8. 9	0. 6	9.10	0. 7	10.12	0. 8	11.13	0. 9	12.14	0. 9
12	7.10	0. 6	8.11	0. 7	9.12	0. 8	10.14	0. 9	11.15	0. 9	12.16	0.10
13	7.11	0. 6	8.12	0. 7	9.14	0. 8	10.15	0. 9	11.17	0.10	12.19	0.11
14	7.13	0. 7	8.15	0. 8	9.17	0. 9	10.18	0.10	11.20	0.11	12.22	0.12
15	7.15	0. 8	8.17	0. 9	9.19	0.10	10.21	0.11	11.23	0.12	12.25	0.13
16	7.17	0. 8	8.19	0. 9	9.22	0.10	10.24	0.12	11.27	0.13	12.29	0.14
17	7.19	0. 9	8.22	0.10	9.25	0.11	10.27	0.12	11.30	0.14	12.33	0.15
18	7.22	0. 9	8.25	0.10	9.28	0.12	10.30	0.13	11.34	0.14	12.38	0.16
19	7.24	0.10	8.28	0.11	9.31	0.12	10.34	0.14	11.38	0.15	12.42	0.17
20	7.27	0.10	8.31	0.12	9.35	0.13	10.39	0.15	11.43	0.16	12.47	0.18
21	7.30	0.11	8.34	0.12	9.39	0.14	10.43	0.16	11.48	0.17	12.52	0.19
22	7.33	0.11	8.38	0.13	9.43	0.15	10.48	0.16	11.53	0.18	12.58	0.20
23	7.36	0.12	8.42	0.14	9.47	0.15	10.53	0.17	11.58	0.19	13. 3	0.21
24	7.40	0.13	8.46	0.14	9.52	0.16	10.58	0.18	12. 4	0.20	13. 9	0.22
25	7.44	0.13	8.50	0.15	9.56	0.17	11. 3	0.19	12. 9	0.21	13.15	0.23
26	7.48	0.14	8.55	0.16	10. 1	0.18	11. 9	0.20	12.15	0.22	13.22	0.24
27	7.52	0.14	8.59	0.16	10. 6	0.19	11.15	0.21	12.22	0.23	13.29	0.25
28	7.56	0.15	9. 4	0.17	10.12	0.19	11.21	0.22	12.29	0.24	13.37	0.26
29	8. 0	0.16	9. 9	0.18	10.18	0.20	11.27	0.22	12.36	0.25	13.45	0.27
30	8. 5	0.16	9.15	0.19	10.24	0.21	11.34	0.23	12.44	0.26	13.53	0.28
31	8.10	0.17	9.21	0.19	10.31	0.22	11.41	0.24	12.52	0.27	14. 2	0.29
32	8.16	0.18	9.27	0.20	10.38	0.23	11.49	0.25	13. 0	0.28	14.11	0.31
33	8.21	0.18	9.33	0.21	10.45	0.24	11.57	0.26	13. 9	0.29	14.21	0.32
34	8.27	0.19	9.40	0.22	10.52	0.25	12. 5	0.27	13.18	0.30	14.32	0.33
35	8.33	0.20	9.47	0.23	11. 0	0.25	12.14	0.28	13.28	0.31	14.43	0.34
36	8.40	0.20	9.54	0.23	11. 9	0.26	12.24	0.29	13.39	0.32	14.54	0.36
37	8.47	0.21	10. 2	0.24	11.18	0.27	12.34	0.31	13.49	0.34	15. 6	0.37
38	8.54	0.22	10.11	0.25	11.27	0.28	12.44	0.32	14. 1	0.35	15.18	0.38
39	9. 1	0.23	10.19	0.26	11.37	0.29	12.55	0.33	14.13	0.36	15.31	0.40
40	9. 9	0.24	10.28	0.27	11.47	0.31	13. 6	0.34	14.25	0.38	15.45	0.41
41	9.18	0.25	10.38	0.28	11.58	0.32	13.18	0.35	14.39	0.39	16. 0	0.43
42	9.26	0.25	10.48	0.29	12. 9	0.33	13.31	0.37	14.53	0.40	16.15	0.44
43	9.35	0.26	10.58	0.30	12.21	0.34	13.44	0.38	15. 7	0.42	16.31	0.46
44	9.45	0.27	11. 9	0.31	12.34	0.35	13.58	0.39	15.23	0.43	16.48	0.47
45	9.55	0.28	11.21	0.32	12.47	0.36	14.13	0.41	15.39	0.45	17. 6	0.49
46	10. 6	0.29	11.33	0.33	13. 1	0.38	14.29	0.42	15.57	0.46	17.25	0.51
47	10.18	0.30	11.47	0.35	13.16	0.39	14.45	0.44	16.15	0.48	17.45	0.53
48	10.30	0.31	12. 1	0.36	13.31	0.41	15. 3	0.45	16.34	0.50	18. 6	0.55
49	10.42	0.32	12.15	0.37	13.48	0.42	15.21	0.47	16.55	0.52	18.28	0.57
50	10.56	0.34	12.30	0.39	14. 5	0.44	15.40	0.49	17.16	0.54	18.52	0.59
51	11.10	0.35	12.47	0.40	14.24	0.45	16. 1	0.50	17.39	0.56	19.18	1. 1
52	11.25	0.36	13. 4	0.41	14.43	0.47	16.23	0.52	18. 3	0.58	19.44	1. 3
53	11.41	0.38	13.22	0.43	15. 4	0.49	16.46	0.54	18.29	1. 0	20.13	1. 6
54	11.58	0.39	13.42	0.45	15.26	0.50	17.11	0.56	18.57	1. 2	20.43	1. 8
55	12.16	0.40	14. 3	0.46	15.50	0.52	17.37	0.58	19.26	1. 4	21.15	1.11
56	12.35	0.42	14.25	0.48	16.15	0.54	18. 6	1. 1	19.57	1. 7	21.50	1.13
57	12.56	0.44	14.48	0.50	16.42	0.56	18.36	1. 3	20.31	1.10	22.26	1.16
58	13.18	0.45	15.13	0.52	17.10	0.59	19. 8	1. 6	21. 7	1.12	23. 6	1.19
59	13 41	0.47	15.41	0.54	17.41	1. 1	19.42	1. 8	21.44	1.16	23.49	1.23
60	14. 6	0.49	16.10	0.56	18.14	1. 4	20.19	1.11	22.26	1.19	24.34	1.26
61	14.34	0.51	16.41	0.59	18.49	1. 6	20.59	1.14	23.11	1.22	25.24	1.30
62	15. 3	0.53	17.15	1. 1	19.28	1. 9	21.43	1.17	23.59	1.26	26.17	1.34
63	15.34	0.56	17.51	1. 4	20. 9	1.12	22.29	1.21	24.51	1.30	27.15	1.39
64	16. 8	0.58	18.31	1. 7	20.54	1.16	23.20	1.25	25.48	1.34	28.19	1.43

Bearing Amplitude and Time Amplitude at Rising and Setting of the Sun.

Lat.	Declination. 13° Bearing Ampl.	13° Time Ampl.	14° Bearing Ampl.	14° Time Ampl.	15° Bearg. Ampl.	15° Time Ampl.	16° Bearg. Ampl.	16° Time Ampl.	17° Bearg. Ampl.	17° Time Ampl.	18° Bearg. Ampl.	18° Time Ampl.
°	° ′	h. m.	° ′	h. m.	° ′	h. m.	° ′	h. m.	° ′	h. m.	° ′	h. m.
1	13. 0	0. 1	14. 0	0. 1	15. 0	0. 1	16. 0	0. 1	17. 0	0. 1	18. 0	0. 1
2	13. 0	0. 2	14. 0	0. 2	15. 0	0. 2	16. 1	0. 2	17. 1	0. 2	18. 1	0. 3
3	13. 1	0. 3	14. 1	0. 3	15. 1	0. 3	16. 1	0. 3	17. 2	0. 4	18. 2	0. 4
4	13. 2	0. 4	14. 2	0. 4	15. 2	0. 4	16. 2	0. 5	17. 3	0. 5	18. 3	0. 5
5	13. 3	0. 5	14. 3	0. 5	15. 4	0. 5	16. 4	0. 6	17. 4	0. 6	18. 4	0. 7
6	13. 4	0. 6	14. 4	0. 6	15. 5	0. 6	16. 5	0. 7	17. 5	0. 7	18. 6	0. 8
7	13. 6	0. 6	14. 6	0 7	15. 7	0. 8	16. 7	0. 8	17. 8	0. 9	18. 8	0. 9
8	13. 8	0. 7	14. 8	0. 8	15. 9	0. 9	16.10	0. 9	17.10	0.10	18.11	0.10
9	13.10	0. 8	14.10	0. 9	15.11	0.10	16.12	0.10	17.13	0.11	18.14	0.12
10	13.13	0. 9	14.14	0.10	15.15	0.11	16.16	0.12	17.17	0.12	18.18	0.13
11	13.15	0.10	14.16	0.11	15.17	0.12	16.18	0.13	17.20	0.14	18.21	0.14
12	13.18	0.11	14.19	0.12	15.21	0.13	16.22	0.14	17.23	0.15	18.25	0.16
13	13.21	0.12	14.22	0.13	15.24	0.14	16.26	0.15	17.28	0.16	18.30	0.17
14	13.24	0.13	14.26	0.14	15.28	0.15	16.30	0.16	17.32	0.17	18.34	0.19
15	13.28	0.14	14.30	0.15	15 33	0.16	16.35	0.18	17.37	0.19	18.40	0.20
16	13.32	0.15	14.34	0.16	15.37	0.18	16.40	0.19	17.43	0.20	18.45	0.21
17	13.36	0.16	14.39	0.17	15.42	0.19	16.45	0.20	17.48	0.21	18.51	0.23
18	13.41	0.17	14.44	0.19	15.47	0.20	16.51	0.21	17.54	0.23	18.57	0.24
19	13.46	0.18	14.50	0.20	15.53	0.21	16.57	0.23	18. 1	0.24	19. 5	0.26
20	13.51	0.19	14.55	0.21	15.59	0.22	17. 4	0.24	18. 8	0.26	19.12	0.27
21	13.57	0.20	15. 1	0.22	16. 6	0.24	17.11	0.25	18.15	0.27	19.20	0.29
22	14. 3	0.21	15. 8	0.23	16.13	0.25	17.18	0.27	18.23	0.28	19.28	0.30
23	14. 9	0.22	15.15	0.24	16.20	0.26	17.26	0.28	18.31	0.30	19.37	0.32
24	14.16	0.24	15.22	0.26	16.28	0.27	17.34	0.29	18.40	0.31	19.46	0.33
25	14.23	0.25	15.29	0.27	16.36	0.29	17.43	0.31	18.49	0.33	19.56	0.35
26	14.30	0.26	15.37	0.28	16.45	0.30	17.52	0.32	18.59	0.34	20. 7	0.36
27	14.38	0.27	15.45	0.29	16.54	0.31	18. 1	0.34	19. 9	0.36	20.18	0.38
28	14.46	0.28	15.54	0.30	17. 3	0.33	18.11	0.35	19.20	0.37	20.29	0.40
29	14.54	0.29	16. 3	0.32	17.13	0.34	18 22	0.37	19.32	0.39	20.41	0.42
30	15. 3	0.31	16.13	0.33	17.23	0.36	18.34	0.38	19.44	0.41	20.54	0.43
31	15.13	0.32	16.23	0.34	17.34	0.37	18.46	0.40	19.57	0.42	21. 8	0.45
32	15.23	0.33	16.34	0.36	17.46	0.39	18.58	0.41	20.10	0.44	21.22	0.47
33	15.34	0.34	16.46	0.37	17.59	0.40	19.11	0.43	20.24	0.46	21.37	0.49
34	15.45	0.36	16.58	0.39	18.12	0.42	19.25	0.45	20.38	0.48	21.53	0.51
35	15.57	0.37	17.11	0.40	18.26	0.43	19.40	0.46	20.54	0.49	22.10	0.53
36	16. 9	0.39	17.24	0.42	18.40	0.45	19.55	0.48	21.11	0.51	22.27	0.55
37	16.22	0.40	17.38	0.43	18.55	0.47	20.11	0.50	21.28	0.53	22.46	0.57
38	16.35	0.42	17.53	0.45	19.10	0.48	20.28	0.52	21.47	0.55	23. 5	0.59
39	16.50	0.43	18. 8	0.47	19.27	0.50	20.46	0.54	22. 6	0.57	23.26	1. 1
40	17. 5	0.45	18.25	0.48	19.45	0.52	21. 5	0.56	22.26	0.59	23.47	1. 3
41	17.21	0.46	18.42	0.50	20. 3	0.54	21.25	0.58	22.48	1. 2	24.10	1. 6
42	17.37	0.48	19. 0	0.52	20.23	0.56	21.46	1. 0	23.10	1. 4	24.34	1. 8
43	17.55	0.50	19.19	0.54	20.43	0.58	22. 8	1. 2	23.34	1. 6	25. 0	1.11
44	18.13	0.52	19.39	0.56	21. 5	1. 0	22.32	1. 4	23.59	1. 9	25.26	1.13
45	18.33	0.53	20. 0	0.58	21.28	1. 2	22.57	1. 7	24.25	1.11	25.55	1.16
46	18.54	0.55	20.23	1. 0	21.53	1. 4	23.23	1. 9	24.53	1.14	26.25	1.19
47	19.16	0.57	20.47	1. 2	22.18	1. 7	23.50	1.12	25 23	1.17	26.57	1.22
48	19.39	0.59	21.12	1. 4	22.45	1. 9	24.20	1.14	25.54	1.19	27.31	1.25
49	20. 3	1. 2	21.38	1. 7	23.14	1.12	24.51	1.17	26.28	1.22	28. 6	1.28
50	20.29	1. 4	22. 7	1. 9	23.45	1.14	25.24	1.20	27. 3	1.25	28.44	1.31
51	20.57	1. 6	22.37	1.12	24.18	1.17	25.59	1.23	27.41	1.29	29.25	1.35
52	21.26	1. 9	23. 9	1.14	24.52	1.20	26.36	1.26	28.21	1.32	30. 7	1.38
53	21.57	1.11	23.43	1.17	25.28	1.23	27.16	1.29	29. 4	1.36	30.54	1.42
54	22.30	1.14	24.18	1.20	26. 7	1.27	27.58	1.33	29.50	1.40	31.43	1.46
55	23. 6	1.17	24.57	1.23	26.50	1.30	28.43	1.37	30.39	1.44	32.36	1.51
56	23.43	1.20	25.38	1.27	27.34	1.34	29.32	1.41	31.32	1.48	33.33	1.55
57	24.23	1.23	26.22	1.30	28.22	1.37	30.24	1.45	32.28	1.52	34.34	2 .0
58	25. 7	1.27	27.10	1.34	29.14	1.42	31.20	1.49	33.29	1.57	35.40	2. 5
59	25.54	1.30	28. 1	1.38	30.10	1.46	32.21	1.54	34.35	2. 2	36 52	2.11
60	26.44	1.34	28.56	1.42	31.10	1.51	33.27	1.59	35.47	2. 8	38.10	2.17
61	27.39	1.38	29.56	1.47	32.16	1.56	34.39	2. 5	37. 5	2.14	39.36	2.24
62	28.38	1.43	31. 1	1.52	33.27	2. 1	35.57	2.11	38.31	2.20	41.10	2.31
63	29.42	1.48	32.12	1.57	34.46	2. 7	37.23	2.17	40. 5	2.27	42.54	2.38
64	30.52	1.53	33.30	2. 3	36.11	2.13	38.58	2.24	41.50	2.35	44.49	2.47

Bearing Amplitude and Time Amplitude at Rising and Setting of the Sun.

Lat.	Declination. 19°		20°		21°		22°		23°		23° 30′		23° 45′	
	Bearing Ampl.	Time Ampl.	Bearing Ampl.	Time Ampl.	Bearing Ampl.	Time Ampl.	Bearing Ampl.	Time Ampl.	Bearing Ampl.	Time Ampl.	Bearing Ampl.	Time Ampl.	Bearing Ampl.	Time Ampl.
°	° ′	h. m	° ′	h. m.	° ′	h. m.	° ′	h. m.	° ′	h. m.	° ′	h. m.	° ′	h. m
1	19. 0	0. 1	20. 0	0. 1	21. 0	0. 2	22. 0	0. 2	23. 1	0. 1	23.31	0. 1	23.46	0. 2
2	19. 1	0. 3	20. 1	0. 3	21. 1	0. 3	22. 1	0. 3	23. 2	0. 3	23.32	0. 3	23.47	0. 4
3	19. 2	0. 4	20. 2	0. 4	21. 2	0. 5	22. 2	0. 5	23. 3	0. 5	23.33	0. 5	23.48	0. 6
4	19. 3	0. 6	20. 3	0. 6	21. 3	0. 6	22. 3	0. 6	23. 4	0. 7	23.34	0. 7	23.49	0. 8
5	19. 4	0. 7	20. 5	0. 7	21. 5	0. 8	22. 5	0. 8	23. 5	0. 9	23.36	0. 9	23.51	0.10
6	19. 6	0. 8	20. 7	0. 9	21. 7	0. 9	22. 7	0.10	23. 8	0.10	23.38	0.10	23.53	0.11
7	19. 9	0.10	20. 9	0.10	21.10	0.11	22.10	0.11	23.11	0.12	23.41	0.12	23.56	0.13
8	19.12	0.11	20.12	0.12	21.13	0.12	22.14	0.13	23.14	0.14	23.44	0.14	23.59	0.15
9	19.15	0.12	20.16	0.13	21.17	0.14	22.18	0.15	23.18	0.15	23.48	0.15	24. 3	0.16
10	19.19	0.14	20.20	0.15	21.21	0.16	22.22	0.16	23.23	0.17	23.53	0.17	24. 8	0.18
11	19.22	0.15	20.24	0.16	21.25	0.17	22.26	0.18	23.27	0.19	23.58	0.19	24.13	0.20
12	19.26	0.17	20.28	0.18	21.30	0.19	22.31	0.20	23.33	0.21	24 .3	0.21	24.18	0.22
13	19.31	0.18	20.33	0.19	21.35	0.20	22.37	0.21	23.39	0.22	24. 9	0.23	24.25	0.23
14	19.36	0.20	20.38	0.21	21.41	0.22	22.43	0.23	23.45	0.24	24.16	0.24	24.32	0.25
15	19.42	0.21	20.44	0.22	21.46	0.24	22.49	0.25	23.51	0.26	24.23	0.26	24.39	0.27
16	19.48	0.23	20.51	0 24	21.53	0.25	22.56	0.27	23.59	0.28	24.30	0.28	24.46	0.29
17	19.54	0.24	20.57	0.26	22. 0	0.27	23. 4	0.28	24. 7	0.30	24.38	0.30	24.54	0.31
18	20. 1	0.26	21. 5	0.27	22. 8	0.29	23.12	0.30	24.15	0.32	24.47	0.32	25. 3	0.33
19	20. 8	0.27	21.12	0.29	22.16	0.30	23.21	0.32	24.24	0.34	24.56	0.34	25.12	0.35
20	20.16	0.29	21.21	0.30	22.25	0.32	23.30	0.34	24.34	0.36	25. 6	0.36	25.22	0.37
21	20.24	0.30	21.30	0.32	22.34	0.34	23.40	0.36	24.45	0.38	25.17	0.38	25.33	0.39
22	20.33	0.32	21.39	0.34	22.44	0.36	23.50	0.38	24.56	0.40	25.28	0.40	25.44	0.41
23	20.43	0.34	21.49	0.36	22.55	0.37	24. 1	0.39	25. 7	0.42	25.40	0.43	25.57	0.43
24	20.53	0.35	21.59	0.37	23. 6	0.39	24.13	0.41	25.19	0.44	25.53	0.45	26.10	0.45
25	21. 3	0.37	22.10	0.39	23.18	0.41	24.25	0.43	25.32	0.46	26. 6	0.47	26.23	0.47
26	21.14	0.39	22.22	0.41	23.30	0.43	24.38	0.45	25.46	0.48	26.20	0.49	26.37	0.49
27	21.26	0.40	22.34	0.43	23.43	0.45	24.52	0.48	26. 1	0.50	26.35	0.51	26.52	0.51
28	21.38	0.42	22.47	0.45	23.57	0.47	25. 6	0.50	26.16	0.52	26.51	0.53	27. 8	0.54
29	21.51	0.44	23. 1	0.47	24.12	0.49	25.22	0.52	26.22	0.54	27. 8	0.55	27.25	0.56
30	22. 5	0.46	23.16	0.49	24.27	0.51	25.38	0.54	26.49	0.57	27.25	0.58	27.43	0.59
31	22.20	0.48	23.31	0.51	24.43	0.53	25.56	0.56	27. 7	0.59	27.44	1. 0	28. 2	1. 1
32	22.35	0.50	23.47	0.53	25. 0	0.56	26.13	0.58	27.26	1. 1	28. 3	1. 3	28.21	1. 4
33	22.51	0.52	24. 4	0.55	25.18	0.58	26.32	1. 1	27.46	1. 4	28.24	1. 5	28.42	1. 6
34	23. 7	0.54	24.22	0.57	25.37	1. 0	26.52	1. 3	28. 7	1. 7	28.45	1. 8	29. 4	1. 9
35	23.25	0.56	24.41	0.59	25.57	1. 2	27.13	1. 6	28.30	1. 9	29. 8	1.11	29.27	1.12
36	23.44	0.58	25. 1	1. 1	26.18	1. 5	27.35	1. 8	28.53	1.12	29.32	1.14	29.51	1.15
37	24. 3	1. 0	25.21	1. 4	26.40	1. 7	27.58	1.11	29.17	1.15	29.57	1.16	30.17	1.17
38	24.24	1. 2	25.43	1. 6	27. 3	1.10	28.23	1.14	29.44	1.17	30.24	1.19	30.44	1.20
39	24.46	1. 5	26. 7	1. 9	27.28	1.12	28.49	1.16	30.11	1.20	30.52	1.22	31.13	1.24
40	25. 9	1. 7	26.31	1.11	27.54	1.15	29.17	1.19	30.40	1.23	31.22	1.25	31.43	1.27
41	25.33	1.10	26.57	1.14	28.21	1.18	29.46	1.22	31.11	1.27	31.54	1.29	32.15	1.30
42	25.59	1.12	27.24	1.17	28.50	1.21	30.16	1.25	31.43	1.30	32.27	1.32	32.49	1.34
43	26.26	1.15	27.53	1.19	29.20	1.24	30.49	1.29	32.18	1.33	33. 3	1.35	33.25	1.37
44	26.55	1.18	28.24	1.22	29.53	1.27	31.23	1.32	32.54	1.37	33.46	1.39	34. 3	1.41
45	27.25	1.21	28.56	1.25	30.27	1.30	31.59	1.35	33.33	1.40	34.20	1.43	34.43	1.44
46	27.57	1.24	29.30	1.29	31. 3	1.34	32.38	1.39	34.14	1.44	35. 2	1.47	35.26	1.48
47	28.31	1.27	30. 6	1.32	31.42	1.37	33.19	1.43	34.57	1.48	35.47	1.51	36.12	1.52
48	29. 7	1.30	30.44	1.35	32.23	1.41	34. 3	1.47	35.44	1.53	36.35	1.56	37. 0	1.57
49	29.45	1.33	31.25	1.39	33. 6	1.45	34.49	1.51	36.33	1.57	37.26	2. 0	37.52	2. 1
50	30.26	1.37	32. 9	1.43	33.53	1.49	35.38	1.55	37.26	2. 2	38.20	2. 5	38.48	2. 6
51	31. 9	1.41	32.55	1.47	34.43	1.53	36.32	2. 0	38.23	2. 6	39.19	2. 9	39.47	2.11
52	31.56	1.45	33.45	1.51	35.36	1.58	37.29	2. 5	39.24	2.12	40.22	2.15	40.51	2.17
53	32.45	1.49	34.38	1.56	36.33	2. 2	38.30	2.10	40.29	2.17	41.29	2.21	42. 0	2.23
54	33.38	1.53	35.35	2. 0	37.34	2. 8	39.36	2.15	41.40	2.23	42.43	2.27	43.15	2.29
55	34.35	1.58	36.36	2. 5	38.40	2.13	40.47	2.21	42.56	2.29	44. 3	2.33	44.36	2.35
56	35.36	2. 3	37.42	2.11	39.51	2.19	42. 4	2.27	44.20	2.36	45.29	2.40	46. 4	2.43
57	36.42	2. 8	38.54	2.16	41. 9	2.25	43.27	2.34	45.51	2.43	47. 4	2.48	47.41	2.50
58	37.54	2.14	40.12	2.22	42.33	2.32	44.59	2.41	47.30	2.51	48.48	2.56	49.28	2.59
59	39.12	2.20	41.37	2.29	44. 6	2.39	46.40	2.49	49.21	3. 0	50.44	3. 5	51.26	3. 8
60	40.37	2.26	43.10	2.36	45.47	2.47	48.32	2.58	51.24	3. 9	52.54	3.15	53.40	3.19
61	42.11	2.34	44.52	2.44	47.40	2.55	50.36	3. 7	53.42	3.20	55.20	3.27	56.10	3.30
62	43.55	2.41	46.46	2.53	49.46	3. 5	52.56	3.18	56.20	3.32	58. 9	3.39	59. 5	3.43
63	45.49	2.50	48.53	3. 2	52. 8	3.16	55.36	3.30	59.23	3.46	61.26	3.55	62.31	3.59
64	47.58	3. 0	51.17	3.13	54.50	3.28	58.43	3.44	63. 2	4. 2	65.27	4.13	66.45	4.18

Reduction of Hor. Par. and Lat. of Place, for Figure of Earth; both subtractive.

Lat.	54′	56′	58′	60′	62′	Red. of Lat.
°	″	″	″	″	″	′ ″
6	0·1	0·1	0·1	0·1	0·1	2 15
12	0·4	0·4	0·4	0·5	0·5	4 24
18	0·9	1·0	1·0	1·1	1·1	6 22
24	1·6	1·7	1·8	1·9	1·9	8 3
30	2·5	2·6	2·7	2·8	2·9	9 23
36	3·5	3·6	3·7	3·9	4·0	10 19
42	4·5	4·7	4·9	5·1	5·2	10 48
48	5·6	5·8	6·0	6·2	6·4	10 48
54	6·6	6·9	7·1	7·4	7·6	10 20
60	7·6	7·9	8·2	8·5	8·7	9 25
66	8·5	8·8	9·1	9·4	9·7	8 5
72	9·2	9·5	9·9	10·2	10·6	6 24
78	9·7	10·1	10·5	10·8	11·2	4 26
84	10·1	10·4	10·8	11·2	11·6	2 16
90	10·2	10·6	11·0	11·3	11·7	0 0

Reduction of Semidiameter on account of Refraction.

Alt.	Inclination to the Horizon.											
	0°	12°	24°	36°	48°	54°	60°	66°	72°	78°	84°	90°
°	″	″	″	″	″	″	″	″	″	″	″	″
5	0	1	4	9	14	16	19	21	23	24	25	25
6	0	1	3	7	10	12	14	16	17	18	19	19
7	0	1	2	5	8	9	11	12	13	14	14	14
8	0	0	2	4	6	7	8	9	10	11	11	11
9	0	0	1	3	5	6	7	8	8	9	9	9
10	0	0	1	3	4	5	6	6	7	7	8	8
12	0	0	1	2	3	4	5	5	5	5	5	5
14	0	0	1	1	2	3	3	3	4	4	4	4
16	0	0	1	1	2	2	2	3	3	3	3	3
20	0	0	0	1	1	1	2	2	2	2	2	2
30	0	0	0	0	1	1	1	1	1	1	1	1
50	0	0	0	0	0	0	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0	0	0	0	0

TABLE 40.

Correction of A. for Planet in clearing Distance.

App. Alt.	Parallax in Altitude.									
	0″	2″	4″	8″	12″	16″	20″	24″	28″	32″
	+	+	+	+	+	+	+	+	+	+
°	″	″	″	″	″	″	″	″	″	″
3	8·0	8·0	8·1	8·2	8·3	8·4	8·6	8·7	8·8	8·9
4	5·4	5·5	5·6	5·7	5·9	6·0	6·2	6·3	6·5	6·7
5	3·8	3·9	4·0	4·1	4·3	4·5	4·7	4·9	5·1	5·3
6	2·8	2·9	3·0	3·2	3·5	3·7	3·9	4·2	4·4	4·7
7	2·1	2·2	2·4	2·6	2·9	3·2	3·5	3·7	4·0	4·3
8	1·7	1·8	2·0	2·3	2·6	2·9	3·3	3·6	3·9	4·2
9	1·3	1·5	1·7	2·0	2·4	2·8	3·1	3·5	3·8	4·2
10	1·1	1·3	1·5	1·9	2·3	2·7	3·1	3·5	3·9	4·3
20	0·0	0·5	0·9	1·8	2·7	3·5	4·3	5·1	6·0	6·8
30	0·0	0·8	1·5	2·8	4·1	5·5	6·8	8·1	9·4	10·7
40	0·0	0·1	2·0	3·9	5·9	7·7	9·7	11·6	13·5	
50	0·0	1·1	2·5	5·2	8·0	10·7	13·4	16·1		
60	0·0	1·5	3·5	7·4	11·4	15·3	19·3			
70	0·0	3·0	6·5	12·8	19·0					
75	0·0	4·4	8·6	17·2						
80	0·0	6·6	13·1	26·0						
85	0·0	13·4	26·0							
88	0·0	33·2	65·8							

TABLE 41.

Correction of Auxiliary Angle for Thermometer and Barometer.

Apparent Altitude.	Factor.	Apparent Altitude.	Factor.	Apparent Altitude.	Factor.
°		°		°	
4	·05	30	·30	56	·48
6	·07	32	·32	58	·49
8	·09	34	·33	60	·50
10	·11	36	·34	62	·52
12	·13	38	·36	64	·52
14	·15	40	·37	66	·53
16	·17	42	·39	68	·53
18	·19	44	·40	70	·54
20	·21	46	·42	72	·54
22	·23	48	·43	74	·55
24	·25	50	·44	78	·57
26	·26	52	·45	82	·57
28	·28	54	·47	86	·58

N.B.—To correct Auxiliary Angle, multiply the Factors answering to the Apparent Altitude of each body by the corrections from table for correcting mean Refraction, and apply the products to the Auxiliary Angle the contrary way to that directed in the Table "For Correction of Mean Refraction."

Fahr. = Cent. $\times \frac{9}{5}$ + 32° = Reau. $\times \frac{9}{4}$ + 32°.

Prop. Logarithms for Seconds and Tenths of Seconds.

"	.0	1	.2	.3	.4	.5	.6	.7	.8	.9
0		5.03342	4.73239	4.55630	4.43136	4.33445	4.25527	4.18833	4.13033	4.07918
1	4.03342	3.99203	3.95424	3.91948	3.88730	3.85733	3.82930	3.80297	3.77815	3.75467
2	3.73239	3.71120	3.69100	3.67170	3.65321	3.63548	3.61845	3.60206	3.58627	3.57103
3	3.55630	3.54206	3.52827	3.51491	3.50194	3.48936	3.47712	3.46522	3.45364	3.44236
4	3.43136	3.42064	3.41017	3.39996	3.38997	3.38021	3.37067	3.36133	3.35218	3.34323
5	3.33445	3.32585	3.31742	3.30915	3.30103	3.29306	3.28524	3.27755	3.27000	3.26257
6	3.25527	3.24809	3.24103	3.23408	3.22724	3.22051	3.21388	3.20735	3.20091	3.19457
7	3.18833	3.18217	3.17609	3.17010	3.16419	3.15836	3.15261	3.14693	3.14133	3.13580
8	3.13033	3.12494	3.11961	3.11435	3.10914	3.10400	3.09893	3.09390	3.08894	3.08403
9	3.07918	3.07438	3.06964	3.06494	3.06030	3.05570	3.05115	3.04665	3.04220	3.03779
10	3.03342	3.02910	3.02482	3.02060	3.01639	3.01223	3.00812	3.00404	3.00000	2.99600
11	2.99203	2.98810	2.98421	2.98035	2.97652	2.97273	2.96897	2.96524	2.96154	2.95788
12	2.95424	2.95064	2.94706	2.94352	2.94000	2.93651	2.93305	2.92962	2.92621	2.92283
13	2.91948	2.91615	2.91285	2.90957	2.90632	2.90309	2.89988	2.89670	2.89354	2.89041
14	2.88730	2.88420	2.88114	2.87809	2.87506	2.87206	2.86907	2.86611	2.86316	2.86024
15	2.85733	2.85445	2.85158	2.84873	2.84590	2.84309	2.84030	2.83752	2.83477	2.83203
16	2.82930	2.82660	2.82391	2.82124	2.81858	2.81594	2.81332	2.81071	2.80811	2.80554
17	2.80297	2.80043	2.79790	2.79538	2.79287	2.79039	2.78791	2.78545	2.78300	2.78057
18	2.77815	2.77575	2.77335	2.77097	2.76861	2.76625	2.76391	2.76158	2.75927	2.75696
19	2.75467	2.75239	2.75012	2.74787	2.74562	2.74339	2.74117	2.73896	2.73676	2.73457
20	2.73239	2.73023	2.72807	2.72593	2.72379	2.72167	2.71956	2.71745	2.71536	2.71328
21	2.71120	2.70914	2.70709	2.70504	2.70301	2.70099	2.69897	2.69696	2.69497	2.69298
22	2.69100	2.68903	2.68707	2.68512	2.68318	2.68124	2.67932	2.67740	2.67549	2.67359
23	2.67170	2.66981	2.66794	2.66607	2.66421	2.66236	2.66051	2.65868	2.65685	2.65503
24	2.65321	2.65141	2.64961	2.64782	2.64603	2.64426	2.64249	2.64073	2.63897	2.63722
25	2.63548	2.63375	2.63202	2.63030	2.62859	2.62688	2.62518	2.62349	2.62180	2.62012
26	2.61845	2.61678	2.61512	2.61347	2.61182	2.61018	2.60854	2.60691	2.60529	2.60367
27	2.60206	2.60045	2.59885	2.59726	2.59567	2.59409	2.59251	2.59094	2.58938	2.58782
28	2.58627	2.58472	2.58317	2.58164	2.58011	2.57858	2.57706	2.57554	2.57403	2.57253
29	2.57103	2.56953	2.56804	2.56656	2.56508	2.56360	2.56213	2.56067	2.55921	2.55775
30	2.55630	2.55486	2.55342	2.55198	2.55055	2.54912	2.54770	2.54629	2.54487	2.54347
31	2.54206	2.54066	2.53927	2.53788	2.53649	2.53511	2.53374	2.53236	2.53100	2.52963
32	2.52827	2.52692	2.52557	2.52422	2.52288	2.52154	2.52021	2.51888	2.51755	2.51623
33	2.51491	2.51360	2.51229	2.51098	2.50968	2.50838	2.50708	2.50579	2.50451	2.50322
34	2.50194	2.50067	2.49940	2.49813	2.49687	2.49560	2.49435	2.49309	2.49184	2.49060
35	2.48936	2.48812	2.48688	2.48565	2.48442	2.48320	2.48197	2.48076	2.47954	2.47833
36	2.47712	2.47592	2.47472	2.47352	2.47232	2.47113	2.46994	2.46876	2.46758	2.46640
37	2.46522	2.46405	2.46288	2.46171	2.46055	2.45939	2.45824	2.45708	2.45593	2.45478
38	2.45364	2.45250	2.45136	2.45022	2.44909	2.44796	2.44684	2.44571	2.44459	2.44347
39	2.44236	2.44125	2.44014	2.43903	2.43793	2.43683	2.43573	2.43463	2.43354	2.43245
40	2.43136	2.43028	2.42920	2.42812	2.42704	2.42597	2.42490	2.42383	2.42276	2.42170
41	2.42064	2.41958	2.41853	2.41747	2.41642	2.41538	2.41433	2.41329	2.41225	2.41121
42	2.41017	2.40914	2.40811	2.40708	2.40606	2.40503	2.40401	2.40300	2.40198	2.40097
43	2.39996	2.39895	2.39794	2.39694	2.39593	2.39493	2.39394	2.39294	2.39195	2.39096
44	2.38997	2.38899	2.38800	2.38702	2.38604	2.38506	2.38409	2.38312	2.38215	2.38118
45	2.38021	2.37925	2.37829	2.37733	2.37637	2.37541	2.37446	2.37351	2.37256	2.37161
46	2.37067	2.36972	2.36878	2.36784	2.36691	2.36597	2.36504	2.36411	2.36318	2.36225
47	2.36133	2.36040	2.35948	2.35856	2.35765	2.35673	2.35582	2.35491	2.35400	2.35309
48	2.35218	2.35128	2.35038	2.34948	2.34858	2.34768	2.34679	2.34589	2.34500	2.34411
49	2.34323	2.34234	2.34146	2.34058	2.33970	2.33882	2.33794	2.33707	2.33619	2.33532
50	2.33445	2.33359	2.33272	2.33186	2.33099	2.33013	2.32927	2.32842	2.32756	2.32671
51	2.32585	2.32500	2.32415	2.32331	2.32246	2.32162	2.32077	2.31993	2.31909	2.31826
52	2.31742	2.31659	2.31575	2.31492	2.31409	2.31326	2.31244	2.31161	2.31079	2.30997
53	2.30915	2.30833	2.30751	2.30670	2.30588	2.30507	2.30426	2.30345	2.30264	2.30183
54	2.30103	2.30023	2.29942	2.29862	2.29782	2.29703	2.29623	2.29544	2.29464	2.29385
55	2.29306	2.29227	2.29148	2.29070	2.28991	2.28913	2.28835	2.28757	2.28679	2.28601
56	2.28524	2.28446	2.28369	2.28292	2.28215	2.28138	2.28061	2.27984	2.27908	2.27831
57	2.27755	2.27679	2.27603	2.27527	2.27451	2.27376	2.27300	2.27225	2.27150	2.27075
58	2.27000	2.26925	2.26850	2.26776	2.26701	2.26627	2.26553	2.26479	2.26405	2.26331
59	2.26257	2.26184	2.26110	2.26037	2.25964	2.25891	2.25818	2.25745	2.25672	2.25600

0^h or 0°.			PROP. LOGARITHMS.						0^h or 0°.
"	0′	1′	2′	3′	4′	5′	6′	7′	"
0		2.25527	1.95424	1.77815	1.65321	1.55630	1.47712	1.41017	0
1	4.03342	2.24809	1.95064	1.77575	1.65141	1.55486	1.47592	1.40914	1
2	3.73239	2.24103	1.94706	1.77335	1.64961	1.55342	1.47472	1.40811	2
3	3.55630	2.23408	1.94352	1.77097	1.64782	1.55198	1.47352	1.40708	3
4	3.43136	2.22724	1.94000	1.76861	1.64603	1.55055	1.47232	1.40606	4
5	3.33445	2.22051	1.93651	1.76625	1.64426	1.54912	1.47113	1.40503	5
6	3.25527	2.21388	1.93305	1.76391	1.64249	1.54770	1.46994	1.40401	6
7	3.18833	2.20735	1.92962	1.76158	1.64073	1.54629	1.46876	1.40300	7
8	3.13033	2.20091	1.92621	1.75927	1.63897	1.54487	1.46758	1.40198	8
9	3.07918	2.19457	1.92283	1.75696	1.63722	1 54347	1.46640	1.40097	9
10	3.03342	2.18833	1.91948	1.75467	1.63548	1.54206	1.46522	1.39996	10
11	2.99203	2.18217	1.91615	1.75239	1.63375	1.54066	1.46405	1.39895	11
12	2.95424	2.17609	1.91285	1.75012	1.63202	1.53927	1.46288	1.39794	12
13	2.91948	2.17010	1.90957	1.74787	1.63030	1.53788	1.46171	1.39694	13
14	2.88730	2.16419	1.90632	1.74562	1.62859	1.53649	1.46055	1.39593	14
15	2.85733	2.15836	1.90309	1.74339	1.62688	1.53511	1.45939	1.39493	15
16	2.82930	2.15261	1.89988	1.74117	1.62518	1.53374	1.45824	1.39394	16
17	2.80297	2.14693	1.89670	1.73896	1.62349	1 53236	1.45708	1.39294	17
18	2.77815	2.14133	1.89354	1.73676	1.62180	1.53100	1.45593	1.39195	18
19	2.75467	2.13580	1.89041	1.73457	1.62012	1.52963	1.45478	1.39096	19
20	2.73239	2.13033	1.88730	1.73239	1.61845	1.52827	1.45364	1.38997	20
21	2.71120	2.12494	1.88420	1.73023	1.61678	1.52692	1.45250	1.38899	21
22	2.69100	2.11961	1.88114	1.72807	1.61512	1.52557	1.45136	1.38800	22
23	2.67170	2.11435	1.87809	1.72593	1.61347	1.52422	1.45022	1.38702	23
24	2.65321	2.10914	1.87506	1.72379	1.61182	1.52288	1.44909	1.38604	24
25	2.63548	2.10400	1.87206	1.72167	1.61018	1.52154	1.44796	1.38506	25
26	2.61845	2.09893	1.86907	1.71956	1.60854	1.52021	1.44684	1.38409	26
27	2.60206	2.09390	1.86611	1.71745	1.60691	1.51888	1.44571	1.38312	27
28	2.58627	2.08894	1.86316	1.71536	1.60529	1.51755	1.44459	1.38215	28
29	2.57103	2.08403	1.86024	1.71328	1.60367	1.51623	1.44347	1.38118	29
30	2.55630	2.07918	1.85733	1.71120	1.60206	1.51491	1.44236	1.38021	30
31	2.54206	2.07438	1.85445	1.70914	1 60045	1.51360	1.44125	1.37925	31
32	2.52827	2.06964	1.85158	1.70709	1.59885	1.51229	1.44014	1.37829	32
33	2.51491	2.06494	1.84873	1.70504	1.59726	1.51098	1.43903	1.37733	33
34	2.50194	2.06030	1.84590	1.70301	1.59567	1.50968	1.43793	1.37637	34
35	2.48936	2.05570	1.84309	1.70099	1.59409	1.50838	1.43683	1.37541	35
36	2.47712	2.05115	1.84030	1.69897	1.59251	1.50708	1.43573	1.37446	36
37	2.46522	2.04665	1.83752	1.69696	1.59094	1.50579	1.43463	1.37351	37
38	2.45364	2.04220	1.83477	1.69497	1.58938	1.50451	1.43354	1.37256	38
39	2.44236	2.03779	1.83203	1.69298	1.58782	1.50322	1.43245	1.37161	39
40	2.43136	2.03342	1.82930	1.69100	1.58627	1.50194	1.43136	1.37067	40
41	2.42064	2.02910	1.82660	1.68903	1.58472	1.50067	1.43028	1.36972	41
42	2.41017	2.02482	1.82391	1.68707	1.58317	1.49940	1.42920	1.36878	42
43	2.39996	2.02060	1.82124	1.68512	1.58164	1.49813	1.42812	1.36784	43
44	2.38997	2.01639	1.81858	1.68318	1.58011	1 49687	1.42704	1.36691	44
45	2.38021	2.01223	1.81594	1.68124	1.57858	1.49560	1.42597	1.36597	45
46	2.37067	2.00812	1.81332	1.67932	1.57706	1.49435	1.42490	1.36504	46
47	2.36133	2.00404	1.81071	1.67740	1.57554	1.49309	1.42383	1.36411	47
48	2.35218	2.00000	1.80811	1.67549	1.57403	1.49184	1.42276	1.36318	48
49	2.34323	1.99600	1.80554	1.67359	1.57253	1.49060	1.42170	1.36225	49
50	2.33445	1.99203	1.80297	1.67170	1.57103	1.48936	1.42064	1.36133	50
51	2.32585	1.98810	1.80043	1.66981	1.56953	1.48812	1.41958	1.36040	51
52	2.31742	1.98421	1.79790	1.66794	1.56804	1.48688	1.41853	1.35948	52
53	2.30915	1.98035	1.79538	1.66607	1.56656	1.48565	1.41747	1.35856	53
54	2.30103	1.97652	1.79287	1.66421	1.56508	1.48442	1.41642	1.35765	54
55	2.29306	1.97273	1.79039	1 66236	1.56360	1.48320	1.41538	1.35673	55
56	2.28524	1.96897	1.78791	1.66051	1.56213	1.48197	1.41433	1.35582	56
57	2.27755	1.96524	1.78545	1.65868	1.56067	1.48076	1.41329	1.35491	57
58	2.27000	1.96154	1.78300	1.65685	1.55921	1.47954	1.41225	1.35400	58
59	2.26257	1.95788	1.78057	1.65503	1 55775	1.47833	1.41121	1.35309	59

0^h or 0°.	PROP. LOGARITHMS.								0^h or 0°.
n	8′	9′	10′	11′	12	13′	14′	15′	n
0	1.35218	1.30103	1.25527	1.21388	1.17609	1.14133	1.10914	1.07918	0
1	1.35128	1.30023	1.25455	1.21322	1.17549	1.14077	1.10863	1.07870	1
2	1.35038	1.29942	1.25383	1.21257	1.17489	1.14022	1.10811	1.07822	2
3	1.34948	1.29862	1.25311	1.21191	1.17429	1.13966	1.10760	1.07774	3
4	1.34858	1.29782	1.25239	1.21126	1.17369	1.13911	1.10708	1.07726	4
5	1.34768	1.29703	1.25167	1.21060	1.17309	1.13855	1.10657	1.07678	5
6	1.34679	1.29623	1.25095	1.20995	1.17249	1.13800	1.10605	1.07630	6
7	1.34589	1 29544	1.25024	1.20930	1.17189	1.13745	1.10554	1.07582	7
8	1.34500	1.29464	1.24952	1.20865	1.17129	1.13690	1.10503	1.07534	8
9	1.34411	1.29385	1.24881	1.20800	1.17070	1.13635	1.10452	1.07486	9
10	1.34323	1.29306	1.24809	1.20735	1.17010	1.13580	1.10400	1.07438	10
11	1.34234	1.29227	1.24738	1.20670	1.16951	1.13525	1.10349	1.07391	11
12	1.34146	1.29148	1.24667	1.20605	1.16891	1.13470	1.10298	1.07343	12
13	1.34058	1.29070	1.24596	1.20541	1.16832	1.13415	1.10247	1.07295	13
14	1.33970	1.28991	1.24526	1.20476	1.16773	1.13360	1.10197	1.07248	14
15	1.33882	1.28913	1.24455	1.20412	1.16714	1.13306	1.10146	1.07200	15
16	1.33794	1.28835	1.24384	1.20348	1.16655	1.13251	1.10095	1.07153	16
17	1.33707	1.28757	1.24314	1.20284	1.16596	1.13197	1.10044	1.07105	17
18	1.33619	1.28679	1.24244	1.20219	1.16537	1.13142	1.09994	1.07058	18
19	1.33532	1.28601	1.24173	1.20155	1.16478	1.13088	1.09943	1.07011	19
20	1.33445	1.28524	1.24103	1.20091	1.16419	1.13033	1.09893	1.06964	20
21	1.33359	1.28446	1.24033	1.20028	1.16361	1.12979	1.09842	1.06916	21
22	1.33272	1.28369	1.23963	1.19964	1.16302	1.12925	1.09792	1.06869	22
23	1.33186	1.28292	1.23894	1.19900	1.16243	1.12871	1.09741	1.06822	23
24	1.33099	1.28215	1.23824	1.19837	1.16185	1.12817	1.09691	1.06775	24
25	1.33013	1.28138	1.23754	1.19773	1.16127	1.12763	1.09641	1.06728	25
26	1.32927	1.28061	1.23685	1.19710	1.16068	1.12709	1.09591	1.06681	26
27	1.32842	1.27984	1.23616	1.19647	1.16010	1.12655	1.09540	1.06634	27
28	1.32756	1.27908	1.23546	1.19584	1.15952	1.12601	1.09490	1.06588	28
29	1.32671	1.27831	1.23477	1.19520	1.15894	1.12548	1.09440	1.06541	29
30	1.32585	1.27755	1.23408	1.19457	1.15836	1.12494	1.09390	1.06494	30
31	1.32500	1.27679	1.23339	1.19395	1.15778	1.12440	1.09341	1.06447	31
32	1.32415	1.27603	1.23271	1.19332	1.15721	1.12387	1.09291	1.06401	32
33	1.32331	1.27527	1.23202	1.19269	1.15663	1.12333	1.09241	1.06354	33
34	1.32246	1.27451	1.23133	1.19206	1.15605	1.12280	1.09191	1.06308	34
35	1.32162	1.27376	1.23065	1.19144	1.15548	1.12227	1.09142	1.06261	35
36	1.32077	1.27300	1.22997	1.19081	1.15490	1.12173	1.09092	1.06215	36
37	1.31993	1.27225	1.22928	1.19019	1.15433	1.12120	1.09042	1.06168	37
38	1.31909	1.27150	1.22860	1.18957	1.15375	1.12067	1.08993	1.06122	38
39	1.31826	1.27075	1.22792	1.18895	1.15318	1.12014	1.08943	1.06076	39
40	1.31742	1.27000	1.22724	1.18833	1.15261	1.11961	1.08894	1.06030	40
41	1.31659	1.26925	1.22657	1.18771	1.15204	1.11908	1.08845	1.05983	41
42	1.31575	1.26850	1.22589	1.18709	1.15147	1.11855	1.08796	1.05937	42
43	1.31492	1.26776	1.22521	1.18647	1.15090	1.11802	1.08746	1.05891	43
44	1.31409	1.26701	1.22454	1.18585	1.15033	1.11750	1.08697	1.05845	44
45	1.31326	1.26627	1.22386	1.18523	1.14976	1.11697	1.08648	1.05799	45
46	1.31244	1.26553	1.22319	1.18462	1.14919	1.11644	1.08599	1.05753	46
47	1.31161	1.26479	1.22252	1.18400	1.14863	1.11592	1.08550	1.05707	47
48	1.31079	1.26405	1.22185	1 18339	1.14806	1.11539	1.08501	1.05662	48
49	1.30997	1.26331	1.22118	1.18278	1.14750	1.11487	1.08452	1.05616	49
50	1.30915	1.26257	1.22051	1.18217	1.14693	1.11435	1.08403	1.05570	50
51	1.30833	1.26184	1.21984	1.18155	1.14637	1.11382	1.08355	1.05524	51
52	1.30751	1.26110	1.21918	1.18094	1.14581	1.11330	1.08306	1.05479	52
53	1.30670	1.26037	1.21851	1.18033	1.14524	1.11278	1.08257	1.05433	53
54	1.30588	1.25964	1.21785	1.17973	1.14468	1.11226	1.08209	1.05388	54
55	1.30507	1.25891	1.21718	1.17912	1.14412	1.11174	1.08160	1.05342	55
56	1.30426	1.25818	1.21652	1.17851	1.14356	1.11122	1.08112	1.05297	56
57	1.30345	1.25745	1.21586	1.17790	1.14300	1.11070	1.08063	1.05251	57
58	1.30264	1.25672	1.21520	1.17730	1.14244	1.11018	1.08015	1.05206	58
59	1.30183	1.25600	1.21454	1.17669	1.14189	1.10966	1.07966	1.05161	59

0^h or 0°.	PROP. LOGARITHMS.									0^h or 0°.
′	16′	17′	18′	19′	20′	21′	22′	23′	24	′
0	1.05115	1.02482	1.00000	.97652	.95424	.93305	.91285	.89354	.87506	0
1	1.05070	1.02440	.99960	.97614	.95388	.93271	.91252	.89323	.87476	1
2	1.05025	1.02397	.99920	.97576	.95352	.93236	.91219	.89292	.87446	2
3	1.04980	1.02355	.99880	.97538	.95316	.93202	.91186	.89260	.87416	3
4	1.04935	1.02312	.99839	.97500	.95280	.93168	.91154	.89229	.87386	4
5	1.04890	1.02270	.99799	.97462	.95244	.93133	.91121	.89197	.87356	5
6	1.04845	1.02228	.99759	.97424	.95208	.93099	.91088	.89166	.87326	6
7	1.04800	1.02185	.99719	.97386	.95172	.93065	.91055	.89135	.87296	7
8	1.04755	1.02143	.99679	.97348	.95136	.93030	.91023	.89103	.87266	8
9	1.04710	1.02101	.99640	.97310	.95100	.92996	.90990	.89072	.87236	9
10	1.04665	1.02059	.99600	.97273	.95064	.92962	.90957	.89041	.87206	10
11	1.04620	1.02017	.99560	.97235	.95028	.92928	.90925	.89010	.87176	11
12	1.04576	1.01974	.99520	.97197	.94992	.92894	.90892	.88978	.87146	12
13	1.04531	1.01932	.99480	.97159	.94956	.92860	.90859	.88947	.87116	13
14	1.04486	1.01890	.99441	.97122	.94921	.92825	.90827	.88916	.87086	14
15	1.04442	1.01848	.99401	.97084	.94885	.92791	.90794	.88885	.87056	15
16	1.04397	1.01806	.99361	.97047	.94849	.92757	.90762	.88854	.87026	16
17	1.04353	1.01764	.99322	.97009	.94813	.92723	.90729	.88823	.86996	17
18	1.04308	1.01723	.99282	.96972	.94778	.92689	.90697	.88792	.86967	18
19	1.04264	1.01681	.99243	.96934	.94742	.92655	.90664	.88761	.86937	19
20	1.04220	1.01639	.99203	.96897	.94706	.92621	.90632	.88730	.86907	20
21	1.04175	1.01597	.99164	.96859	.94671	.92587	.90599	.88699	.86877	21
22	1.04131	1.01556	.99124	.96822	.94635	.92554	.90567	.88668	.86848	22
23	1.04087	1.01514	.99085	.96784	.94600	.92520	.90535	.88637	.86818	23
24	1.04043	1.01472	.99045	.96747	.94564	.92486	.90502	.88606	.86788	24
25	1.03999	1.01431	.99006	.96710	.94529	.92452	.90470	.88575	.86759	25
26	1.03955	1.01389	.98967	.96673	.94493	.92418	.90438	.88544	.86729	26
27	1.03911	1.01348	.98928	.96635	.94458	.92385	.90406	.88513	.86699	27
28	1.03867	1.01306	.98888	.96598	.94423	.92351	.90373	.88482	.86670	28
29	1.03823	1.01265	.98849	.96561	.94387	.92317	.90341	.88451	.86640	29
30	1.03779	1.01223	.98810	.96524	.94352	.92283	.90309	.88420	.86611	30
31	1.03735	1.01182	.98771	.96487	.94317	.92250	.90277	.88390	.86581	31
32	1.03691	1.01141	.98732	.96450	.94281	.92216	.90245	.88359	.86552	32
33	1.03647	1.01100	.98693	.96413	.94246	.92183	.90213	.88328	.86522	33
34	1.03604	1.01058	.98654	.96376	.94211	.92149	.90181	.88297	.86493	34
35	1.03560	1.01017	.98615	.96339	.94176	.92115	.90148	.88267	.86463	35
36	1.03516	1.00976	.98576	.96302	.94141	.92082	.90116	.88236	.86434	36
37	1.03473	1.00935	.98537	.96265	.94105	.92048	.90084	.88205	.86404	37
38	1.03429	1.00894	.98498	.96228	.94070	.92015	.90052	.88175	.86375	38
39	1.03386	1.00853	.98459	.96191	.94035	.91981	.90020	.88144	.86346	39
40	1.03342	1.00812	.98421	.96154	.94000	.91948	.89988	.88114	.86316	40
41	1.03299	1.00771	.98382	.96117	.93965	.91915	.89957	.88083	.86287	41
42	1.03256	1.00730	.98343	.96081	.93930	.91881	.89925	.88052	.86258	42
43	1.03212	1.00689	.98304	.96044	.93895	.91848	.89893	.88022	.86228	43
44	1.03169	1.00648	.98266	.96007	.93860	.91815	.89861	.87991	.86199	44
45	1.03126	1.00607	.98227	.95971	.93825	.91781	.89829	.87961	.86170	45
46	1.03083	1.00567	.98189	.95934	.93791	.91748	.89797	.87930	.86140	46
47	1.03039	1.00526	.98150	.95897	.93756	.91715	.89766	.87900	.86111	47
48	1.02996	1.00485	.98111	.95861	.93721	.91682	.89734	.87870	.86082	48
49	1.02953	1.00445	.98073	.95824	.93686	.91648	.89702	.87839	.86053	49
50	1.02910	1.00404	.98035	.95788	.93651	.91615	.89670	.87809	.86024	50
51	1.02867	1.00363	.97996	.95751	.93617	.91582	.89639	.87778	.85995	51
52	1.02824	1.00323	.97958	.95715	.93582	.91549	.89607	.87748	.85965	52
53	1.02781	1.00282	.97919	.95678	.93547	.91516	.89575	.87718	.85936	53
54	1.02739	1.00242	.97881	.95642	.93513	.91483	.89544	.87687	.85907	54
55	1.02696	1.00202	.97843	.95606	.93478	.91450	.89512	.87657	.85878	55
56	1.02653	1.00161	.97805	.95569	.93443	.91417	.89481	.87627	.85849	56
57	1.02610	1.00121	.97766	.95533	.93409	.91384	.89449	.87597	.85820	57
58	1.02568	1.00080	.97728	.95497	.93374	.91351	.89417	.87566	.85791	58
59	1.02525	1.00040	.97690	.95460	.93340	.91318	.89386	.87536	.85762	59

0h or 0°.	PROP. LOGARITHMS.									0h or 0°.
″	25′	26′	27′	28′	29′	30′	31′	32′	33′	″
0	.85733	.84030	.82391	.80811	.79287	.77815	.76391	.75012	.73676	0
1	.85704	.84002	.82364	.80786	.79262	.77791	.76368	.74990	.73654	1
2	.85675	.83974	.82337	.80760	.79238	.77767	.76344	.74967	.73632	2
3	.85646	.83946	.82311	.80734	.79213	.77743	.76321	.74944	.73610	3
4	.85618	.83919	.82284	.80708	.79188	.77719	.76298	.74922	.73588	4
5	.85589	.83891	.82257	.80683	.79163	.77695	.76274	.74899	.73566	5
6	.85560	.83863	.82230	.80657	.79138	.77671	.76251	.74877	.73544	6
7	.85531	.83835	.82204	.80631	.79113	.77647	.76228	.74854	.73523	7
8	.85502	.83808	.82177	.80605	.79088	.77623	.76205	.74832	.73501	8
9	.85473	.83780	.82150	.80579	.79063	.77599	.76181	.74809	.73479	9
10	.85445	.83752	.82124	.80554	.79039	.77575	.76158	.74787	.73457	10
11	.85416	.83725	.82097	.80528	.79014	.77551	.76135	.74764	.73435	11
12	.85387	.83697	.82070	.80502	.78989	.77527	.76112	.74742	.73413	12
13	.85358	.83670	.82044	.80477	.78964	.77503	.76089	.74719	.73392	13
14	.85330	.83642	.82017	.80451	.78939	.77479	.76065	.74697	.73370	14
15	.85301	.83614	.81991	.80425	.78915	.77455	.76042	.74674	.73348	15
16	.85272	.83587	.81964	.80400	.78890	.77431	.76019	.74652	.73326	16
17	.85244	.83559	.81938	.80374	.78865	.77407	.75996	.74629	.73305	17
18	.85215	.83532	.81911	.80349	.78840	.77383	.75973	.74607	.73283	18
19	.85187	.83504	.81884	.80323	.78816	.77359	.75950	.74585	.73261	19
20	.85158	.83477	.81858	.80297	.78791	.77335	.75927	.74562	.73239	20
21	.85129	.83449	.81832	.80272	.78766	.77311	.75903	.74540	.73218	21
22	.85101	.83422	.81805	.80246	.78742	.77288	.75880	.74517	.73196	22
23	.85072	.83394	.81779	.80221	.78717	.77264	.75857	.74495	.73174	23
24	.85044	.83367	.81752	.80195	.78693	.77240	.75834	.74473	.73153	24
25	.85015	.83339	.81726	.80170	.78668	.77216	.75811	.74450	.73131	25
26	.84987	.83312	.81699	.80144	.78643	.77192	.75788	.74428	.73109	26
27	.84958	.83285	.81673	.80119	.78619	.77169	.75765	.74406	.73088	27
28	.84930	.83257	.81647	.80094	.78594	.77145	.75742	.74383	.73066	28
29	.84902	.83230	.81620	.80068	.78570	.77121	.75719	.74361	.73044	29
30	.84873	.83203	.81594	.80043	.78545	.77097	.75696	.74339	.73023	30
31	.84845	.83175	.81568	.80017	.78521	.77074	.75673	.74317	.73001	31
32	.84816	.83148	.81541	.79992	.78496	.77050	.75650	.74294	.72980	32
33	.84788	.83121	.81515	.79967	.78472	.77026	.75627	.74272	.72958	33
34	.84760	.83094	.81489	.79941	.78447	.77002	.75604	.74250	.72936	34
35	.84732	.83066	.81463	.79916	.78423	.76979	.75581	.74228	.72915	35
36	.84703	.83039	.81436	.79891	.78398	.76955	.75559	.74205	.72893	36
37	.84675	.83012	.81410	.79865	.78374	.76931	.75536	.74183	.72872	37
38	.84647	.82985	.81384	.79840	.78349	.76908	.75513	.74161	.72850	38
39	.84619	.82958	.81358	.79815	.78325	.76884	.75490	.74139	.72829	39
40	.84590	.82930	.81332	.79790	.78300	.76861	.75467	.74117	.72807	40
41	.84562	.82903	.81305	.79764	.78276	.76837	.75444	.74095	.72786	41
42	.84534	.82876	.81279	.79739	.78252	.76813	.75421	.74072	.72764	42
43	.84506	.82849	.81253	.79714	.78227	.76790	.75398	.74050	.72743	43
44	.84478	.82822	.81227	.79689	.78203	.76766	.75376	.74028	.72721	44
45	.84450	.82795	.81201	.79663	.78179	.76743	.75353	.74006	.72700	45
46	.84421	.82768	.81175	.79638	.78154	.76719	.75330	.73984	.72678	46
47	.84393	.82741	.81149	.79613	.78130	.76696	.75307	.73962	.72657	47
48	.84365	.82714	.81123	.79588	.78106	.76672	.75285	.73940	.72636	48
49	.84337	.82687	.81097	.79563	.78081	.76649	.75262	.73918	.72614	49
50	.84309	.82660	.81071	.79538	.78057	.76625	.75239	.73896	.72593	50
51	.84281	.82633	.81045	.79513	.78033	.76602	.75216	.73874	.72571	51
52	.84253	.82606	.81019	.79488	.78009	.76578	.75194	.73852	.72550	52
53	.84225	.82579	.80993	.79463	.77984	.76555	.75171	.73830	.72529	53
54	.84197	.82552	.80967	.79437	.77960	.76531	.75148	.73808	.72507	54
55	.84169	.82525	.80941	.79412	.77936	.76508	.75126	.73786	.72486	55
56	.84141	.82498	.80915	.79387	.77912	.76485	.75103	.73764	.72465	56
57	.84114	.82471	.80889	.79362	.77888	.76461	.75080	.73742	.72443	57
58	.84086	.82445	.80863	.79337	.77863	.76438	.75058	.73720	.72422	58
59	.84058	.82418	.80837	.79312	.77839	.76414	.75035	.73698	.72401	59

0h or 0°.	PROP. LOGARITHMS.									0h or 0°.
″	34′	35′	36′	37′	38′	39′	40′	41′	42′	″
0	.72379	.71120	.69897	.68707	.67549	.66421	.65321	.64249	.63202	0
1	.72358	.71100	.69877	.68688	.67530	.66402	.65303	.64231	.63185	1
2	.72337	.71079	.69857	.68668	.67511	.66384	.65285	.64214	.63168	2
3	.72316	.71058	.69837	.68648	.67492	.66365	.65267	.64196	.63151	3
4	.72294	.71038	.69817	.68629	.67473	.66347	.65249	.64178	.63133	4
5	.72273	.71017	.69797	.68609	.67454	.66328	.65231	.64161	.63116	5
6	.72252	.70997	.69777	.68590	.67435	.66310	.65213	.64143	.63099	6
7	.72231	.70976	.69756	.68570	.67416	.66291	.65195	.64125	.63082	7
8	.72209	.70955	.69736	.68551	.67397	.66273	.65177	.64108	.63065	8
9	.72188	.70935	.69716	.68531	.67378	.66254	.65159	.64090	.63047	9
10	.72167	.70914	.69696	.68512	.67359	.66236	.65141	.64073	.63030	10
11	.72146	.70894	.69676	.68492	.67340	.66217	.65123	.64055	.63013	11
12	.72125	.70873	.69656	.68473	.67321	.66199	.65105	.64038	.62996	12
13	.72103	.70852	.69636	.68454	.67302	.66180	.65087	.64020	.62979	13
14	.72082	.70832	.69616	.68434	.67283	.66162	.65069	.64002	.62962	14
15	.72061	.70811	.69596	.68415	.67264	.66143	.65051	.63985	.62945	15
16	.72040	.70791	.69576	.68395	.67245	.66125	.65033	.63967	.62927	16
17	.72019	.70770	.69557	.68376	.67226	.66106	.65015	.63950	.62910	17
18	.71998	.70750	.69537	.68356	.67207	.66088	.64997	.63932	.62893	18
19	.71977	.70729	.69517	.68337	.67188	.66070	.64979	.63915	.62876	19
20	.71956	.70709	.69497	.68318	.67170	.66051	.64961	.63897	.62859	20
21	.71935	.70688	.69477	.68298	.67151	.66033	.64943	.63880	.62842	21
22	.71914	.70668	.69457	.68279	.67132	.66014	.64925	.63862	.62825	22
23	.71892	.70647	.69437	.68259	.67113	.65996	.64907	.63845	.62808	23
24	.71871	.70627	.69417	.68240	.67094	.65978	.64889	.63827	.62791	24
25	.71850	.70606	.69397	.68221	.67075	.65959	.64871	.63810	.62774	25
26	.71829	.70586	.69377	.68201	.67056	.65941	.64853	.63792	.62757	26
27	.71808	.70566	.69357	.68182	.67038	.65923	.64835	.63775	.62739	27
28	.71787	.70545	.69338	.68163	.67019	.65904	.64818	.63757	.62722	28
29	.71766	.70525	.69318	.68143	.67000	.65886	.64800	.63740	.62705	29
30	.71745	.70504	.69298	.68124	.66981	.65868	.64782	.63722	.62688	30
31	.71724	.70484	.69278	.68105	.66962	.65849	.64764	.63705	.62671	31
32	.71703	.70464	.69258	.68086	.66944	.65831	.64746	.63688	.62654	32
33	.71682	.70443	.69239	.68066	.66925	.65813	.64728	.63670	.62637	33
34	.71661	.70423	.69219	.68047	.66906	.65794	.64710	.63653	.62620	34
35	.71641	.70403	.69199	.68028	.66887	.65776	.64692	.63635	.62603	35
36	.71620	.70382	.69179	.68009	.66869	.65758	.64675	.63618	.62586	36
37	.71599	.70362	.69159	.67989	.66850	.65739	.64657	.63601	.62569	37
38	.71578	.70342	.69140	.67970	.66831	.65721	.64639	.63583	.62552	38
39	.71557	.70321	.69120	.67951	.66812	.65703	.64621	.63566	.62535	39
40	.71536	.70301	.69100	.67932	.66794	.65685	.64603	.63548	.62518	40
41	.71515	.70281	.69080	.67912	.66775	.65666	.64586	.63531	.62501	41
42	.71494	.70260	.69061	.67893	.66756	.65648	.64568	.63514	.62485	42
43	.71473	.70240	.69041	.67874	.66737	.65630	.64550	.63496	.62468	43
44	.71453	.70220	.69021	.67855	.66719	.65612	.64532	.63479	.62451	44
45	.71432	.70200	.69002	.67836	.66700	.65594	.64514	.63462	.62434	45
46	.71411	.70179	.68982	.67816	.66681	.65575	.64497	.63444	.62417	46
47	.71390	.70159	.68962	.67797	.66663	.65557	.64479	.63427	.62400	47
48	.71369	.70139	.68942	.67778	.66644	.65539	.64461	.63410	.62383	48
49	.71349	.70119	.68923	.67759	.66625	.65521	.64443	.63392	.62366	49
50	.71328	.70099	.68903	.67740	.66607	.65503	.64426	.63375	.62349	50
51	.71307	.70078	.68884	.67721	.66588	.65484	.64408	.63358	.62332	51
52	.71286	.70058	.68864	.67702	.66570	.65466	.64390	.63340	.62315	52
53	.71265	.70038	.68844	.67682	.66551	.65448	.64373	.63323	.62298	53
54	.71245	.70018	.68825	.67663	.66532	.65430	.64355	.63306	.62282	54
55	.71224	.69998	.68805	.67644	.66514	.65412	.64337	.63289	.62265	55
56	.71203	.69977	.68785	.67625	.66495	.65394	.64320	.63271	.62248	56
57	.71183	.69957	.68766	.67606	.66477	.65376	.64302	.63254	.62231	57
58	.71162	.69937	.68746	.67587	.66458	.65357	.64284	.63237	.62214	58
59	.71141	.69917	.68727	.67568	.66439	.65339	.64267	.63220	.62197	59

0^h or $0°$.	PROP. LOGARITHMS.									0^h or $0°$.
$''$	43′	44′	45′	46′	47′	48′	49′	50′	51′	$''$
0	.62180	.61182	.60206	.59251	.58317	.57403	.56508	.55630	.54770	0
1	.62164	.61166	.60190	.59236	.58302	.57388	.56493	.55616	.54756	1
2	.62147	.61149	.60174	.59220	.58287	.57373	.56478	.55601	.54742	2
3	.62130	.61133	.60158	.59204	.58271	.57358	.56463	.55587	.54728	3
4	.62113	.61116	.60142	.59189	.58256	.57343	.56449	.55572	.54714	4
5	.62096	.61100	.60126	.59173	.58241	.57328	.56434	.55558	.54699	5
6	.62080	.61083	.60110	.59157	.58225	.57313	.56419	.55543	.54685	6
7	.62063	.61067	.60094	.59141	.58210	.57298	.56404	.55529	.54671	7
8	.62046	.61051	.60078	.59126	.58194	.57283	.56390	.55515	.54657	8
9	.62029	.61034	.60061	.59110	.58179	.57268	.56375	.55500	.54643	9
10	.62012	.61018	.60045	.59094	.58164	.57253	.56360	.55486	.54629	10
11	.61996	.61001	.60029	.59079	.58148	.57238	.56345	.55471	.54614	11
12	.61979	.60985	.60013	.59063	.58133	.57223	.56331	.55457	.54600	12
13	.61962	.60969	.59997	.59047	.58118	.57208	.56316	.55442	.54586	13
14	.61945	.60952	.59981	.59032	.58102	.57193	.56301	.55428	.54572	14
15	.61929	.60936	.59965	.59016	.58087	.57178	.56287	.55414	.54558	15
16	.61912	.60920	.59949	.59000	.58072	.57163	.56272	.55399	.54544	16
17	.61895	.60903	.59933	.58985	.58056	.57148	.56257	.55385	.54530	17
18	.61878	.60887	.59917	.58969	.58041	.57133	.56243	.55370	.54516	18
19	.61862	.60871	.59901	.58953	.58026	.57118	.56228	.55356	.54501	19
20	.61845	.60854	.59885	.58938	.58011	.57103	.56213	.55342	.54487	20
21	.61828	.60838	.59870	.58922	.57995	.57088	.56199	.55327	.54473	21
22	.61812	.60822	.59854	.58907	.57980	.57073	.56184	.55313	.54459	22
23	.61795	.60805	.59838	.58891	.57965	.57058	.56169	.55299	.54445	23
24	.61778	.60789	.59822	.58875	.57949	.57043	.56155	.55284	.54431	24
25	.61762	.60773	.59806	.58860	.57934	.57028	.56140	.55270	.54417	25
26	.61745	.60756	.59790	.58844	.57919	.57013	.56125	.55255	.54403	26
27	.61728	.60740	.59774	.58829	.57904	.56998	.56111	.55241	.54389	27
28	.61712	.60724	.59758	.58813	.57888	.56983	.56096	.55227	.54375	28
29	.61695	.60708	.59742	.58798	.57873	.56968	.56081	.55212	.54361	29
30	.61678	.60691	.59726	.58782	.57858	.56953	.56067	.55198	.54347	30
31	.61662	.60675	.59710	.58766	.57843	.56938	.56052	.55184	.54332	31
32	.61645	.60659	.59694	.58751	.57827	.56923	.56037	.55169	.54318	32
33	.61628	.60642	.59678	.58735	.57812	.56908	.56023	.55155	.54304	33
34	.61612	.60626	.59663	.58720	.57797	.56893	.56008	.55141	.54290	34
35	.61595	.60610	.59647	.58704	.57782	.56879	.55994	.55127	.54276	35
36	.61579	.60594	.59631	.58689	.57767	.56864	.55979	.55112	.54262	36
37	.61562	.60578	.59615	.58673	.57751	.56849	.55964	.55098	.54248	37
38	.61545	.60561	.59599	.58658	.57736	.56834	.55950	.55084	.54234	38
39	.61529	.60545	.59583	.58642	.57721	.56819	.55935	.55069	.54220	39
40	.61512	.60529	.59567	.58627	.57706	.56804	.55921	.55055	.54206	40
41	.61496	.60513	.59551	.58611	.57691	.56789	.55906	.55041	.54192	41
42	.61479	.60496	.59536	.58596	.57675	.56774	.55892	.55026	.54178	42
43	.61463	.60480	.59520	.58580	.57660	.56759	.55877	.55012	.54164	43
44	.61446	.60464	.59504	.58565	.57645	.56745	.55862	.54998	.54150	44
45	.61429	.60448	.59488	.58549	.57630	.56730	.55848	.54984	.54136	45
46	.61413	.60432	.59472	.58534	.57615	.56715	.55833	.54969	.54122	46
47	.61396	.60416	.59457	.58518	.57600	.56700	.55819	.54955	.54108	47
48	.61380	.60399	.59441	.58503	.57584	.56685	.55804	.54941	.54094	48
49	61363	.60383	.59425	.58487	.57569	.56670	.55790	.54927	.54080	49
50	.61347	.60367	.59409	.58472	.57554	.56656	.55775	.54912	.54066	50
51	.61330	.60351	.59393	.58456	.57539	.56641	.55761	.54898	.54052	51
52	.61314	.60335	.59378	.58441	.57524	.56626	.55746	.54884	.54038	52
53	.61297	.60319	.59362	.58425	.57509	.56611	.55732	.54870	.54024	53
54	.61281	.60303	.59346	.58410	.57494	.56596	.55717	.54855	.54011	54
55	.61264	.60286	.59330	.58395	.57479	.56582	.55703	.54841	.53997	55
56	.61248	.60270	.59314	.58379	.57463	.56567	.55688	.54827	.53983	56
57	.61231	.60254	.59299	.58364	.57448	.56552	.55674	.54813	.53969	57
58	.61215	.60238	.59283	.58348	.57433	.56537	.55659	.54799	.53955	58
59	.61198	.60222	.59267	.58333	.57418	.56522	.55645	.54784	.53941	59

0h or 0°.	PROP. LOGARITHMS.								0h or 0°.
″	52′	53′	54′	55′	56′	57′	58′	59′	″
0	.53927	.53100	.52288	.51491	.50708	.49940	.49184	.48442	0
1	.53913	.53086	.52274	.51478	.50696	.49927	.49172	.48430	1
2	.53899	.53072	.52261	.51465	.50683	.49914	.49159	.48418	2
3	.53885	.53059	.52248	.51452	.50670	.49902	.49147	.48405	3
4	.53871	.53045	.52234	.51438	.50657	.49889	.49135	.48393	4
5	.53857	.53031	.52221	.51425	50644	.49876	.49122	.48381	5
6	.53843	.53018	.52208	.51412	50631	.49864	.49110	.48369	6
7	.53830	.53004	.52194	.51399	.50618	.49851	.49097	.48356	7
8	.53816	.52991	.52181	.51386	50605	.49838	.49085	.48344	8
9	.53802	.52977	.52167	.51373	.50592	.49826	.49072	.48332	9
10	.53788	.52963	.52154	.51360	50579	.49813	.49060	.48320	10
11	.53774	52950	.52141	.51346	50566	.49800	.49047	.48307	11
12	.53760	.52936	.52127	.51333	.50554	.49788	.49035	.48295	12
13	.53746	.52922	.52114	.51320	50541	.49775	.49023	.48283	13
14	.53732	.52909	.52101	.51307	50528	.49762	.49010	.48271	14
15	.53719	.52895	.52087	.51294	50515	.49750	.48998	.48258	15
16	.53705	.52882	.52074	.51281	50502	.49737	.48985	.48246	16
17	.53691	.52868	.52061	.51268	50489	.49724	.48973	.48234	17
18	.53677	.52855	.52047	.51255	50476	.49712	.48960	.48222	18
19	.53663	.52841	.52034	.51242	50464	.49699	.48948	.48210	19
20	.53649	.52827	.52021	.51229	50451	.49687	.48936	.48197	20
21	.53636	52814	.52007	.51215	.50438	.49674	.48923	.48185	21
22	.53622	.52800	.51994	.51202	.50425	.49661	.48911	.48173	22
23	.53608	.52787	.51981	.51189	.50412	.49649	.48898	.48161	23
24	.53594	52773	.51967	.51176	.50399	.49636	.48886	.48149	24
25	.53580	.52760	.51954	.51163	.50387	.49623	.48874	.48136	25
26	.53567	.52746	.51941	.51150	.50374	.49611	.48861	.48124	26
27	.53553	.52732	.51927	.51137	.50361	.49598	.48849	.48112	27
28	.53539	.52719	.51914	.51124	.50348	.49586	.48836	.48100	28
29	.53525	.52705	.51901	.51111	.50335	.49573	.48824	.48088	29
30	.53511	.52692	.51888	.51098	.50322	.49560	.48812	.48076	30
31	.53498	.52678	.51874	.51085	.50310	.49548	.48799	.48063	31
32	.53484	52665	.51861	.51072	.50297	.49535	.48787	.48051	32
33	.53470	52651	.51848	.51059	.50284	.49523	.48775	.48039	33
34	.53456	.52638	.51835	.51046	50271	.49510	.48762	.48027	34
35	.53442	.52624	.51821	.51033	.50258	.49498	.48750	.48015	35
36	.53429	.52611	.51808	.51020	.50246	.49485	.48737	.48003	36
37	.53415	.52597	.51795	51007	.50233	.49472	.48725	.47990	37
38	.53401	.52584	.51781	50994	.50220	.49460	.48713	.47978	38
39	.53387	.52570	.51768	50981	.50207	.49447	.48700	.47966	39
40	.53374	.52557	.51755	50968	.50194	.49435	.48688	.47954	40
41	.53360	.52543	.51742	50955	.50182	.49422	.48676	.47942	41
42	.53346	.52530	.51729	.50942	.50169	.49410	.48663	.47930	42
43	.53332	.52516	.51715	.50929	.50156	.49397	.48651	.47918	43
44	.53319	.52503	.51702	50916	50143	.49385	.48639	.47906	44
45	.53305	.52489	.51689	.50903	.50131	.49372	.48626	.47893	45
46	.53291	.52476	.51676	.50890	50118	.49360	.48614	.47881	46
47	.53278	.52462	.51662	.50877	.50105	.49347	.48602	.47869	47
48	.53264	.52449	.51649	.50864	.50092	.49334	.48590	.47857	48
49	.53250	.52436	.51636	.50851	.50080	.49322	.48577	.47845	49
50	.53236	.52422	.51623	50838	.50067	.49309	.48565	.47833	50
51	.53223	.52409	.51610	.50825	.50054	.49297	.48553	.47821	51
52	.53209	.52395	.51596	.50812	.50041	.49284	.48540	.47809	52
53	.53195	.52382	.51583	50799	.50029	.49272	.48528	.47797	53
54	53182	.52368	.51570	.50786	.50016	.49259	.48516	.47785	54
55	.53168	.52355	.51557	.50773	.50003	.49247	.48503	.47772	55
56	.53154	.52342	.51544	.50760	.49991	.49234	.48491	.47760	56
57	.53141	.52328	.51530	.50747	.49978	.49222	.48479	.47748	57
58	.53127	.52315	.51517	.50734	.49965	.49209	.48467	.47736	58
59	.53113	.52301	.51504	.50721	.49952	.49197	.48454	.47724	59

1" or 1'.	PROP. LOGARITHMS.									1h or 1'.
"	0'	1	2'	3'	4'	5	6'	7'	8'	9'
0	.47712	.46994	.46288	.45593	.44909	.44236	.43573	.42920	.42276	.41642
1	.47700	.46982	.46276	.45582	.44898	.44225	.43562	.42909	.42266	.41632
2	.47688	.46971	.46265	.45570	.44887	.44214	.43551	.42898	.42255	.41621
3	.47676	.46959	.46253	.45559	.44875	.44203	.43540	.42887	.42244	.41611
4	.47664	.46947	.46241	.45547	.44864	.44191	.43529	.42877	.42234	.41600
5	.47652	.46935	.46230	.45536	.44853	.44180	.43518	.42866	.42223	.41590
6	.47640	.46923	.46218	.45524	.44841	.44169	.43507	.42855	.42213	.41579
7	.47628	.46911	.46206	.45513	.44830	.44158	.43496	.42844	.42202	.41569
8	.47616	.46899	.46195	.45501	.44819	.44147	.43485	.42833	.42191	.41559
9	.47604	.46888	.46183	.45490	.44808	.44136	.43474	.42823	.42181	.41548
10	.47592	.46876	.46171	.45478	.44796	.44125	.43463	.42812	.42170	.41538
11	.47580	.46864	.46160	.45467	.44785	.44114	.43452	.42801	.42159	.41527
12	.47568	.46852	.46148	.45456	.44774	.44102	.43441	.42790	.42149	.41517
13	.47556	.46840	.46137	.45444	.44762	.44091	.43431	.42780	.42138	.41506
14	.47544	.46828	.46125	.45433	.44751	.44080	.43420	.42769	.42128	.41496
15	.47532	.46817	.46113	.45421	.44740	.44069	.43409	.42758	.42117	.41485
16	.47520	.46805	.46102	.45410	.44729	.44058	.43398	.42747	.42106	.41475
17	.47508	.46793	.46090	.45398	.44717	.44047	.43387	.42737	.42096	.41464
18	.47496	.46781	.46078	.45387	.44706	.44036	.43376	.42726	.42085	.41454
19	.47484	.46769	.46067	.45375	.44695	.44025	.43365	.42715	.42075	.41443
20	.47472	.46758	.46055	.45364	.44684	.44014	.43354	.42704	.42064	.41433
21	.47460	.46746	.46044	.45353	.44672	.44003	.43343	.42693	.42053	.41423
22	.47448	.46734	.46032	.45341	.44661	.43992	.43332	.42683	.42043	.41412
23	.47436	.46722	.46020	.45330	.44650	.43981	.43321	.42672	.42032	.41402
24	.47424	.46710	.46009	.45318	.44639	.43969	.43310	.42661	.42022	.41391
25	.47412	.46699	.45997	.45307	.44627	.43958	.43300	.42651	.42011	.41381
26	.47400	.46687	.45986	.45295	.44616	.43947	.43289	.42640	.42000	.41370
27	.47388	.46675	.45974	.45284	.44605	.43936	.43278	.42629	.41990	.41360
28	.47376	.46663	.45962	.45273	.44594	.43925	.43267	.42618	.41979	.41350
29	.47364	.46652	.45951	.45261	.44583	.43914	.43256	.42608	.41969	.41339
30	.47352	.46640	.45939	.45250	.44571	.43903	.43245	.42597	.41958	.41329
31	.47340	.46628	.45928	.45238	.44560	.43892	.43234	.42586	.41948	.41318
32	.47328	.46616	.45916	.45227	.44549	.43881	.43223	.42575	.41937	.41308
33	.47316	.46604	.45905	.45216	.44538	.43870	.43212	.42565	.41927	.41298
34	.47304	.46593	.45893	.45204	.44526	.43859	.43202	.42554	.41916	.41287
35	.47292	.46581	.45881	.45193	.44515	.43848	.43191	.42543	.41905	.41277
36	.47280	46569	.45870	.45182	.44504	.43837	.43180	.42533	.41895	.41266
37	47268	.46557	.45858	.45170	.44493	.43826	.43169	.42522	.41884	.41256
38	.47256	.46546	.45847	.45159	.44482	.43815	.43158	.42511	.41874	.41246
39	.47244	.46534	.45835	.45147	.44470	.43804	.43147	.42500	.41863	.41235
40	.47232	.46522	.45824	.45136	.44459	.43793	.43136	.42490	.41853	.41225
41	.47220	.46510	.45812	.45125	.44448	.43782	.43126	.42479	.41842	.41214
42	.47208	.46499	.45800	.45113	.44437	.43771	.43115	.42468	.41832	.41204
43	.47196	.46487	.45789	.45102	.44426	.43760	.43104	.42458	.41821	.41194
44	.47185	.46475	.45777	.45091	.44414	.43749	.43093	.42447	.41811	.41183
45	.47173	.46464	.45766	.45079	.44403	.43738	.43082	.42436	.41800	.41173
46	.47161	.46452	.45754	.45068	.44392	.43727	.43071	.42426	.41789	.41162
47	.47149	.46440	.45743	.45057	.44381	.43716	.43060	.42415	.41779	.41152
48	.47137	.46428	.45731	.45045	.44370	.43705	.43050	.42404	.41768	.41142
49	.47125	.46417	.45720	.45034	.44359	.43694	.43039	.42394	.41758	.41131
50	.47113	.46405	.45708	.45022	.44347	.43683	.43028	.42383	.41747	.41121
51	.47101	.46393	.45697	.45011	.44336	.43672	.43017	.42372	.41737	.41111
52	.47089	.46382	.45685	.45000	.44325	.43661	.43006	.42362	.41726	.41100
53	.47077	.46370	.45674	.44988	.44314	.43650	.42995	.42351	.41716	.41090
54	.47066	.46358	.45662	.44977	.44303	.43639	.42985	.42340	.41705	.41080
55	.47054	.46346	.45651	.44966	.44292	.43628	.42974	.42330	.41695	.41069
56	.47042	.46335	.45639	.44955	.44280	.43617	.42963	.42319	.41684	.41059
57	.47030	.46323	.45628	.44943	.44269	.43606	.42952	.42308	.41674	.41048
58	.47018	.46311	.45616	.44932	.44258	.43595	.42941	.42298	.41663	.41038
59	.47006	.46300	.45605	.44921	.44247	.43584	.42931	.42287	.41653	.41028

1h or 1°.	PROP. LOGARITHMS.									1h or 1°.
"	10′	11′	12′	13′	14′	15′	16′	17′	18′	19′
0	.41017	.40401	.39794	.39195	.38604	.38021	.37446	.36878	.36318	.35765
1	.41007	.40391	.39784	.39185	.38594	.38011	.37436	.36869	.36309	.35755
2	.40997	.40381	.39774	.39175	.38585	.38002	.37427	.36859	.36299	.35746
3	.40986	.40371	.39764	.39165	.38575	.37992	.37417	.36850	.36290	.35737
4	.40976	.40361	.39754	.39155	.38565	.37983	.37408	.36841	.36281	.35728
5	.40966	.40350	.39744	.39145	.38555	.37973	.37398	.36831	.36271	.35719
6	.40955	.40340	.39734	.39136	.38545	.37963	.37389	.36822	.36262	.35710
7	.40945	.40330	.39724	.39126	.38536	.37954	.87379	.36812	.36253	.35700
8	.40935	.40320	.39714	.39116	.38526	.37944	.37370	.36803	.36244	.35691
9	.40924	.40310	.39704	.39106	.38516	.37934	.37360	.36794	.36234	.35682
10	.40914	.40300	.39694	.39096	.38506	.37925	.37351	.36784	.36225	.35673
11	.40904	.40289	.39684	.39086	.38497	.37915	.37341	.36775	.36216	.35664
12	.40894	.40279	.39674	.39076	.38487	.37905	.37332	.36766	.36207	.35655
13	.40883	.40269	.39664	.39066	.38477	.37896	.37322	.36756	.36197	.35646
14	.40873	.40259	.39653	.39056	.38467	.37886	.37313	.36747	.36188	.35636
15	.40863	.40249	.39643	.39046	.38458	.37877	.37303	.36737	.36179	.35627
16	.40852	.40239	.39633	.39037	.38448	.37867	.37294	.36728	.36170	.35618
17	.40842	.40228	.39623	.39027	.38438	.37857	.37284	.36719	.36160	.35609
18	.40832	.40218	.39613	.39017	.38428	.37848	.37275	.36709	.36151	.35600
19	.40821	.40208	.39603	.39007	.38419	.37838	.37265	.36700	.36142	.35591
20	.40811	.40198	.39593	.38997	.38409	.37829	.37256	.36691	.36133	.35582
21	.40801	.40188	.39583	.38987	.38399	.37819	.37246	.36681	.36123	.35573
22	.40791	.40178	.39573	.38977	.38389	.37809	.37237	.36672	.36114	.35563
23	.40780	.40168	.39563	.38968	.38380	.37800	.37227	.36663	.36105	.35554
24	.40770	.40157	.39553	.38958	.38370	.37790	.37218	.36653	.36096	.35545
25	.40760	.40147	.39543	.38948	.38360	.37781	.37208	.36644	.36086	.35536
26	.40749	.40137	.39533	.38938	.38351	.37771	.37199	.36634	.36077	.35527
27	.40739	.40127	.39523	.38928	.38341	.37761	.37189	.36625	.36068	.35518
28	.40729	.40117	.39513	.38918	.38331	.37752	.37180	.36616	.36059	.35509
29	.40719	.40107	.39503	.38908	.38321	.37742	.37171	.36606	.36050	.35500
30	.40708	.40097	.39493	.38899	.38312	.37733	.37161	.36597	.36040	.35491
31	.40698	.40087	.39483	.38889	.38302	.37723	.37152	.36588	.36031	.35481
32	.40688	.40076	.39473	.38879	.38292	.37713	.37142	.36578	.36022	.35472
33	.40678	.40066	.39464	.38869	.38282	.37704	.37133	.36569	.36013	.35463
34	.40667	.40056	.39454	.38859	.38273	.37694	.37123	.36560	.36003	.35454
35	.40657	.40046	.39444	.38849	.38263	.37685	.37114	.36550	.35994	.35445
36	.40647	.40036	.39434	.38839	.38253	.37675	.37104	.36541	.35985	.35436
37	.40637	.40026	.39424	.38830	.38244	.37665	.37095	.36532	.35976	.35427
38	.40626	.40016	.39414	.38820	.38234	.37656	.37085	.36522	.35967	.35418
39	.40616	.40006	.39404	.38810	.38224	.37646	.37076	.36513	.35957	.35409
40	.40606	.39996	.39394	.38800	.38215	.37637	.37067	.36504	.35948	.35400
41	.40596	.39985	.39384	.38790	.38205	.37627	.37057	.36494	.35939	.35391
42	.40585	.39975	.39374	.38781	.38195	.37618	.37048	.36485	.35930	.35381
43	.40575	.39965	.39364	.38771	.38186	.37608	.37038	.36476	.35921	.35372
44	.40565	.39955	.39354	.38761	.38176	.37599	.37029	.36467	.35911	.35363
45	.40555	.39945	.39344	.38751	.38166	.37589	.37019	.36457	.35902	.35354
46	.40544	.39935	.39334	.38741	.38156	.37579	.37010	.36448	.35893	.35345
47	.40534	.39925	.39324	.38731	.38147	.37570	.37001	.36439	.35884	.35336
48	.40524	.39915	.39314	.38722	.38137	.37560	.36991	.36429	.35875	.35327
49	.40514	.39905	.39304	.38712	.38127	.37551	.36982	.36420	.35865	.35318
50	.40503	.39895	.39294	.38702	.38118	.37541	.36972	.36411	.35856	.35309
51	.40493	.39885	.39284	.38692	.38108	.37532	.36963	.36401	.35847	.35300
52	.40483	.39874	.39274	.38682	.38098	.37522	.36953	.36392	.35838	.35291
53	.40473	.39864	.39264	.38673	.38089	.37513	.36944	.36383	.35829	.35282
54	.40463	.39854	.39254	.38663	.38079	.37503	.36935	.36374	.35820	.35273
55	.40452	.39844	.39245	.38653	.38069	.37494	.36925	.36364	.35810	.35264
56	.40442	.39834	.39235	.38643	.38060	.37484	.36916	.36355	.35801	.35254
57	.40432	.39824	.39225	.38633	.38050	.37474	.36906	.36346	.35792	.35245
58	.40422	.39814	.39215	.38624	.38040	.37465	.36897	.36336	.35783	.35236
59	.40412	.39804	.39205	.38614	.38031	.37455	.36888	.36327	.35774	.35227

1h or 1°.	PROP. LOGARITHMS.									1h or 1°.
″	20′	21′	22′	23′	24′	25′	26′	27′	28′	29′
0	.35218	.34679	.34146	.33619	.33099	.32585	.32077	.31575	.31079	.30588
1	.35209	.34670	.34137	.33611	.33091	.32577	.32069	.31567	.31071	.30580
2	.35200	.34661	.34128	.33602	.33082	.32568	.32061	.31559	.31063	.30572
3	.35191	.34652	.34119	.33593	.33073	.32560	.32052	.31550	.31054	.30564
4	.35182	.34643	.34111	.33585	.33065	.32551	.32044	.31542	.31046	.30556
5	.35173	.34634	.34102	.33576	.33056	.32543	.32035	.31534	.31038	.30548
6	.35164	.34625	.34093	.33567	.33048	.32534	.32027	.31525	.31030	.30539
7	.35155	.34616	.34084	.33558	.33039	.32526	.32019	.31517	.31021	.30531
8	.35146	.34607	.34075	.33550	.33030	.32517	.32010	.31509	.31013	.30523
9	.35137	.34598	.34066	.33541	.33022	.32509	.32002	.31501	.31005	.30515
10	.35128	.34589	.34058	.33532	.33013	.32500	.31993	.31492	.30997	.30507
11	.35119	.34581	.34049	.33524	.33005	.32492	.31985	.31484	.30989	.30499
12	.35110	.34572	.34040	.33515	.32996	.32483	.31977	.31476	.30980	.30491.
13	.35101	.34563	.34031	.33506	.32987	.32475	.31968	.31467	.30972	.30483
14	.35092	.34554	.34022	.33498	.32979	.32466	.31960	.31459	.30964	.30475
15	.35083	.34545	.34014	.33489	.32970	.32458	.31951	.31451	.30956	.30466
16	.35074	.34536	.34005	.33480	.32962	.32449	.31943	.31442	.30948	.30458
17	.35065	.34527	.33996	.33471	.32953	.32441	.31935	.31434	.30939	.30450
18	.35056	.34518	.33987	.33463	.32944	.32432	.31926	.31426	.30931	.30442
19	.35047	.34509	.33978	.33454	.32936	.32424	.31918	.31418	.30923	.30434
20	.35038	.34500	.33970	.33445	.32927	.32415	.31909	.31409	.30915	.30426
21	.35029	.34491	.33961	.33437	.32919	.32407	.31901	.31401	.30907	.30418
22	.35020	.34483	.33952	.33428	.32910	.32398	.31893	.31393	.30898	.30410
23	.35011	.34474	.33943	.33419	.32902	.32390	.31884	.31384	.30890	.30402
24	.35002	.34465	.33935	.33411	.32893	.32381	.31876	.31376	.30882	.30393
25	.34993	.34456	.33926	.33402	.32884	.32373	.31867	.31368	.30874	.30385
26	.34984	.34447	.33917	.33393	.32876	.32365	.31859	.31360	.30866	.30377
27	.34975	.34438	.33908	.33385	.32867	.32356	.31851	.31351	.30857	.30369
28	.34966	.34429	.33899	.33376	.32859	.32348	.31842	.31343	.30849	.30361
29	.34957	.34420	.33891	.33367	.32850	.32339	.31834	.31335	.30841	.30353
30	.34948	.34411	.33882	.33359	.32842	.32331	.31826	.31326	.30833	.30345
31	.34939	.34403	.33873	.33350	.32833	.32322	.31817	.31318	.30825	.30337
32	.34930	.34394	.33864	.33341	.32824	.32314	.31809	.31310	.30817	.30329
33	.34921	.34385	.33856	.33333	.32816	.32305	.31801	.31302	.30808	.30321
34	.34912	.34376	.33847	.33324	.32807	.32297	.31792	.31293	.30800	.30313
35	.34903	.34367	.33838	.33315	.32799	.32288	.31784	.31285	.30792	.30305
36	.34894	.34358	.33829	.33307	.32790	.32280	.31775	.31277	.30784	.30296
37	.34885	.34349	.33820	.33298	.32782	.32271	.31767	.31269	.30776	.30288
38	.34876	.34340	.33812	.33289	.32773	.32263	.31759	.31260	.30768	.30280
39	.34867	.34332	.33803	.33281	.32765	.32255	.31750	.31252	.30759	.30272
40	.34858	.34323	.33794	.33272	.32756	.32246	.31742	.31244	.30751	.30264
41	.34849	.34314	.33785	.33263	.32747	.32238	.31734	.31236	.30743	.30256
42	.34840	.34305	.33777	.33255	.32739	.32229	.31725	.31227	.30735	.30248
43	.34831	.34296	.33768	.33246	.32730	.32221	.31717	.31219	.30727	.30240
44	.34822	.34287	.33759	.33237	.32722	.32212	.31709	.31211	.30718	.30232
45	.34813	.34278	.33750	.33229	.32713	.32204	.31700	.31203	.30710	.30224
46	.34804	.34270	.33742	.33220	.32705	.32195	.31692	.31194	.30702	.30216
47	.34795	.34261	.33733	.33211	.32696	.32187	.31684	.31186	.30694	.30208
48	.34786	.34252	.33724	.33203	.32688	.32179	.31675	.31178	.30686	.30200
49	.34777	.34243	.33715	.33194	.32679	.32170	.31667	.31170	.30678	.30192
50	.34768	.34234	.33707	.33186	.32671	.32162	.31659	.31161	.30670	.30183
51	.34759	.34225	.33698	.33177	.32662	.32153	.31650	.31153	.30662	.30175
52	.34750	.34217	.33689	.33168	.32654	.32145	.31642	.31145	.30653	.30167
53	.34741	.34208	.33681	.33160	.32645	.32136	.31634	.31137	.30645	.30159
54	.34732	.34199	.33672	.33151	.32636	.32128	.31625	.31128	.30637	.30151
55	.34723	.34190	.33663	.33142	.32628	.32120	.31617	.31120	.30629	.30143
56	.34715	.34181	.33654	.33134	.32619	.32111	.31609	.31112	.30621	.30135
57	.34706	.34172	.33646	.33125	.32611	.32103	.31600	.31104	.30613	.30127
58	.34697	.34164	.33637	.33117	.32602	.32094	.31592	.31095	.30605	.30119
59	.34688	.34155	.33628	.33108	.32594	.32086	.31584	.31087	.30596	.30111

1h or 1°.	PROP. LOGARITHMS.									1h or 1°.
″	30′	31′	32′	33′	34′	35′	36′	37′	38′	39′
0	.30103	.29623	.29148	.28679	.28214	.27755	.27300	.26850	.26405	.25964
1	.30095	.29615	.29141	.28671	.28207	.27747	.27293	.26843	.26397	.25956
2	.30087	.29607	.29133	.28663	.28199	.27740	.27285	.26835	.26390	.25949
3	.30079	.29599	.29125	.28656	.28191	.27732	.27278	.26828	.26382	.25942
4	.30071	.29591	.29117	.28648	.28184	.27724	.27270	.26820	.26375	.25934
5	.30063	.29583	.29109	.28640	.28176	.27717	.27262	.26813	.26368	.25927
6	.30055	.29575	.29101	.28632	.28168	.27709	.27255	.26805	.26360	.25920
7	.30047	.29567	.29093	.28625	.28161	.27702	.27247	26798	.26353	.25913
8	.30039	.29560	.29086	.28617	.28153	.27694	.27240	.26790	.26346	.25905
9	.30031	.29552	.29078	.28609	.28145	.27686	.27232	.26783	.26338	.25898
10	.30023	.29544	.29070	.28601	.28138	.27679	.27225	.26775	.26331	.25891
11	.30015	.29536	.29062	.28593	.28130	.27671	.27217	.26768	.26323	.25883
12	.30007	.29528	.29054	.28586	.28122	.27664	.27210	.26761	.26316	.25876
13	.29999	.29520	.29046	.28578	.28114	.27656	.27202	.26753	.26309	.25869
14	.29991	.29512	.29038	.28570	.28107	.27648	.27195	.26746	.26301	.25861
15	.29983	.29504	.29031	.28562	.28099	.27641	.27187	.26738	.26294	.25854
16	.29975	.29496	.29023	.28555	.28091	.27633	.27180	.26731	.26287	.25847
17	.29966	.29488	.29015	.28547	.28084	.27626	.27172	.26723	.26279	.25839
18	.29958	.29480	.2900·	.28539	.28076	.27618	.27165	.26716	.26272	.25832
19	.29950	.29472	.28999	.28531	.28068	.27610	.27157	.26709	.26265	.25825
20	.29942	.29464	.28991	.28524	.28061	.27603	.27150	.26701	.26257	.25818
21	.29934	.29456	.28984	.28516	.28053	.27595	.27142	.26694	.26250	.25810
22	.29926	.29448	.28976	.28508	.28045	.27588	.27135	.26686	.26242	.25803
23	.29918	.29441	.28968	.28500	.28038	.27580	.27127	.26679	.26235	.25796
24	.29910	.29433	.28960	.28493	.28030	.27572	.27120	.26671	.26228	.25789
25	.29902	.29425	.28952	.28485	.28022	.27565	.27112	.26664	.26220	.25781
26	.29894	.29417	.28944	.28477	.28015	.27557	.27105	.26656	.26213	.25774
27	.29886	.29409	.28937	.28469	.28007	.27550	.27097	.26649	.26206	.2576/
28	.29878	.29401	.28929	.28462	.27999	.27542	.27090	.26642	.26198	.25759
29	.29870	.29393	.28921	.28454	.27992	.27534	.27082	.26634	.26191	.25752
30	.29862	.29385	.28913	.28446	.27984	.27527	.27075	.26627	.26184	.25745
31	.29854	.29377	.28905	.28438	.27976	.27519	.27067	.26619	.26176	.25738
32	.29846	.29369	.28897	.28431	.27969	.27512	.27060	.26612	.26169	.25730
33	.29838	.29361	.28890	.28423	.27961	.27504	.27052	.26605	.26162	.25723
34	.29830	.29354	.28882	.28415	.27953	.27497	.27045	.26597	.26154	.25716
35	.29822	.29346	.28874	.28407	.27946	.27489	.27037	.26590	.26147	.25709
36	.29814	.29338	.28866	.28400	.27938	.27481	.27030	.26582	.26140	.25701
37	.29806	.29330	.28858	.28392	.27930	.27474	.27022	.26575	.26132	.25694
38	.29798	.29322	.28851	.28384	.27923	.27466	.27015	.26567	.26125	.25687
39	.29790	.29314	.28843	.28376	.27915	.27459	.27007	.26560	26118	.25680
40	.29782	.29306	.28835	.28369	.27908	.27451	.27000	.26553	.26110	.25672
41	.29775	.29298	.28827	.28361	.27900	.27444	.26992	.26545	.26103	.25665
42	.29767	.29290	.28819	.28353	.27892	.27436	.26985	.26538	.26096	.25658
43	.29759	.29282	.28811	.28346	.27885	.27428	.26977	.26530	.26088	.25650
44	.29751	.29275	.28804	.28338	.27877	.27421	.26970	.26523	.26081	.25643
45	.29743	.29267	.28796	.28330	.27869	.27413	.26962	.26516	.26074	.25636
46	.29735	.29259	.28788	.28322	.27862	.27406	.26955	.26508	.26066	.25629
47	.29727	.29251	.28780	.28315	.27854	.27398	.26947	.26501	.26059	.25621
48	.29719	.29243	.28772	.28307	.27846	.27391	.26940	.26493	.26052	.25614
49	.29711	.29235	.28765	.28299	.27839	.27383	.26932	.26486	.26044	.25607
50	.29703	.29227	.28757	.28292	.27831	.27376	.26925	.26479	.26037	.25600
51	.29695	.29219	.28749	.28284	.27824	.27368	.26917	.26471	.26030	.25592
52	.29687	.29211	.28741	.28276	.27816	.27360	.26910	.26464	.26022	.25585
53	.29679	.29204	.28733	.28268	.27808	.27353	.26902	.26456	.26015	.25578
54	.29671	.29196	.28726	.28261	.27801	.27345	.26895	.26449	.26008	.25571
55	.29663	.29188	.28718	.28253	.27793	.27338	.26887	.26442	.26000	.25563
56	.29655	.29180	.28710	.28245	.27785	.27330	.26880	.26434	.25993	.25556
57	.29647	.29172	.28702	.28238	.27778	.27323	.26872	.26427	.25986	.25549
58	.29639	.29164	.28695	.28230	.27770	.27315	.26865	.26420	.25978	.25542
59	.29631	.29156	.28687	.28222	.27763	.27308	.26858	.26412	.25971	.25534

1h or 1°.	PROP. LOGARITHMS.									1h or 1°.
″	40′	41′	42′	43′	44′	45′	46′	47′	48′	49′
0	.25527	.25095	.24667	.24244	.23824	.23408	.22997	.22589	.22185	.21785
1	.25520	.25088	.24660	.24237	.23817	.23401	.22990	.22582	.22178	.21778
2	.25513	.25081	.24653	.24229	.23810	.23395	.22983	.22575	.22171	.21771
3	.25506	.25074	.24646	.24222	.23803	.23388	.22976	.22569	.22165	.21765
4	.25498	.25066	.24639	.24215	.23796	.23381	22969	.22562	.22158	21758
5	.25491	.25059	.24632	.24208	.23789	.23374	.22963	.22555	.22151	21751
6	.25484	.25052	.24625	24201	.23782	.23367	.22956	.22548	.22145	21745
7	.25477	.25045	.24618	.24194	.23775	·23360	.22949	.22542	.22138	.21738
8	.25469	.25038	.24610	.24187	.23768	.23353	.22942	.22535	.22131	.21732
9	.25462	.25031	.24603	.24180	.23761	.23346	.22935	.22528	.22125	.21725
10	.25455	.25024	.24596	.24173	.23754	.23339	.22928	.22521	.22118	.21718
11	.25448	.25016	.24589	.24166	.23747	.23333	.22922	.22515	22111	.21712
12	.25440	.25009	.24582	.24159	23740	.23326	.22915	.22508	.22105	21705
13	.25433	.25002	.24575	.24152	.23734	.23319	.22908	.22501	.22098	.21698
14	.25426	.24995	.24568	.24145	.23727	23312	.22901	.22494	.22091	.21692
15	.25419	.24988	.24561	.24138	.23720	.23305	.22894	.22488	.22084	.21685
16	.25412	.24981	.24554	.24131	.23713	.23298	.22888	22481	.22078	.21678
17	.25404	.24974	.24547	.24124	.23706	.23291	.22881	.22474	.22071	.21672
18	.25397	.24966	.24540	.24117	.23699	.23284	.22874	.22467	.22064	.21665
19	.25390	.24959	24533	.24110	.23692	.23278	.22867	.22461	.22058	.21659
20	.25383	.24952	.24526	.24103	.23685	.23271	.22860	.22454	.22051	.21652
21	.25376	.24945	.24518	.24096	.23678	.23264	.22854	.22447	.22044	.21645
22	.25368	.24938	.24511	.24089	.23671	.23257	.22847	.22440	.22038	.21639
23	.25361	.24931	.24504	.24082	.23664	.23250	.22840	.22434	.22031	.21632
24	.25354	.24923	.24497	.24075	.23657	.23243	.22833	.22427	.22024	21626
25	.25347	.24916	.24490	.24068	.23650	.23236	.22826	.22420	.22018	.21619
26	.25339	.24909	.24483	.24061	.23643	.23229	.22819	.22413	.22011	.21612
27	.25332	.24902	.24476	.24054	.23636	.23223	.22813	.22407	.22004	.21606
28	.25325	.24895	.24469	.24047	.23629	.23216	.22806	.22400	21998	21599
29	.25318	.24888	.24462	.24040	.23623	.23209	22799	.22393	.21991	21592
30	.25311	.24881	.24455	.24033	.23616	.23202	22792	.22386	.21984	.21586
31	.25303	.24874	.24448	.24026	.23609	23195	.22785	.22380	.21978	21579
32	.25296	.24866	.24441	.24019	23602	.23188	.22779	.22373	.21971	.21573
33	.25289	.24859	.24434	.24012	.23595	.23181	.22772	.22366	.21964	.21566
34	.25282	.24852	.24427	.24005	.23588	.23175	.22765	.22359	.21958	.21559
35	.25275	.24845	.24420	.23998	.23581	.23168	.22758	.22353	.21951	.21553
36	.25267	.24838	.24413	.23991	.23574	.23161	.22752	.22346	.21944	.21546
37	.25260	.24831	.24405	.23984	.23567	.23154	.22745	.22339	.21938	21540
38	.25253	.24824	.24398	.23977	.23560	.23147	.22738	.22333	.21931	.21533
39	.25246	.24817	.24391	.23970	.23553	.23140	.22731	.22326	.21924	.21526
40	.25239	.24809	.24384	.23963	.23546	.23133	.22724	.22319	.21918	.21520
41	.25231	.24802	.24377	.23956	.23539	.23127	.22718	.22312	.21911	.21513
42	.25224	.24795	.24370	.23949	.23533	.23120	22711	.22306	.21904	.21507
43	.25217	.24788	.24363	.23942	.23526	.23113	.22704	.22299	.21898	.21500
44	.25210	.24781	.24356	.23935	.23519	.23106	.22697	.22292	.21891	.21493
45	.25203	.24774	.24349	.23928	.23512	.23099	.22690	.22286	.21884	.21487
46	.25196	.24767	.24342	.23921	.23505	.23092	.22684	.22279	.21878	.21480
47	.25188	.24760	.24335	.23914	.23498	.23086	.22677	.22272	.21871	.21474
48	.25181	.24752	.24328	.23908	.23491	.23079	.22670	.22265	.21864	.21467
49	.25174	.24745	.24321	.23901	.23484	.23072	.22663	.22259	.21858	.21460
50	.25167	.24738	.24314	.23894	.23477	.23065	.22657	.22252	.21851	.21454
51	.25160	.24731	.24307	.23887	.23470	.23058	.22650	.22245	.21844	.21447
52	.25152	.24724	.24300	.23880	.23464	.23051	.22643	.22239	.21838	.21441
53	.25145	.24717	.24293	.23873	.23457	.23044	.22636	.22232	.21831	.21434
54	.25138	.24710	.24286	.23866	.23450	.23038	.22629	.22225	.21824	.21427
55	.25131	.24703	.24279	.23859	.23443	.23031	.22623	.22218	.21818	.21421
56	.25124	.24696	.24272	.23852	.23436	.23024	.22616	.22212	.21811	.21414
57	.25117	.24689	.24265	.23845	.23429	.23017	.22609	.22205	.21805	.21408
58	.25109	.24681	.24258	.23838	.23422	.23010	.22602	.22198	.21798	.21401
59	.25102	.24674	.24251	.23831	.23415	.23003	.22596	.22192	.21791	.21395

1ʰ or 1ᵐ.	PROP. LOGARITHMS.									1ʰ or 1ᵐ.
″	50′	51′	52′	53′	54′	55′	56′	57′	58′	59′
0	.21388	.20995	.20605	.20219	.19837	.19457	.19081	.18710	.18339	.17973
1	.21381	.20988	.20599	.20213	.19830	.19451	.19075	.18702	.18333	.17966
2	.21375	.20982	.20593	.20207	.19824	.19445	.19069	.18696	.18327	.17960
3	.21368	.20975	.20586	.20200	.19818	.19439	.19063	.18690	.18321	.17954
4	.21362	.20969	.20580	.20194	.19811	.19432	.19056	.18684	.18315	.17948
5	.21355	.20962	.20573	.20187	.19805	.19426	.19050	.18678	.18308	.17942
6	.21349	.20956	.20567	.20181	.19799	.19420	.19044	.18672	.18302	.17936
7	.21342	.20949	.20560	.20175	.19792	.19413	.19038	.18665	.18296	.17930
8	.21335	.20943	.20554	.20168	.19786	.19407	.19032	.18659	.18290	.17924
9	.21329	.20936	.20547	.20162	.19780	.19401	.19025	.18653	.18284	.17918
10	.21322	.20930	.20541	.20155	.19773	.19395	.19019	.18647	.18278	.17912
11	.21316	.20923	.20534	.20149	.19767	.19388	.19013	.18641	.18272	.17906
12	.21309	.20917	.20528	.20143	.19761	.19382	.19007	.18634	.18266	.17900
13	.21303	.20910	.20522	.20136	.19754	.19376	.19000	.18628	.18259	.17894
14	.21296	20904	.20515	.20130	.19748	.19369	.18994	.18622	18253	.17887
15	.21289	.20897	.20509	.20123	.19742	.19363	.18988	.18616	.18247	.17881
16	.21283	.20891	.20502	.20117	.19735	.19357	.18982	.18610	.18241	.17875
17	.21276	.20884	.20496	.20111	.19729	.19351	.18976	.18604	.18235	.17869
18	.21270	.20878	.20489	.20104	.19723	.19344	.18969	.18597	.18229	.17863
19	.21263	.20871	.20483	.20098	.19716	.19338	.18963	.18591	.18223	.17857
20	.21257	.20865	.20476	.20091	.19710	.19332	.18957	.18585	.18217	.17851
21	.21250	.20858	.20470	.20085	.19704	.19325	.18951	.18579	18210	.17845
22	.21243	.20852	.20464	.20079	.19697	.19319	.18944	.18573	18204	.17839
23	.21237	.20845	.20457	.20072	.19691	.19313	.18938	.18567	.18198	.17833
24	.21230	.20839	.20451	.20066	.19685	.19307	.18932	.18560	.18192	.17827
25	.21224	.20832	.20444	.20060	.19678	.19300	.18926	.18554	.18186	.17821
26	.21217	.20826	.20438	.20053	.19672	.19294	.18920	.18548	.18180	.17815
27	.21211	.20819	.20431	.20047	.19666	.19288	.18913	.18542	.18174	.17809
28	.21204	.20813	.20425	.20040	.19659	.19282	.18907	.18536	.18168	.17803
29	.21198	.20806	.20418	.20034	.19653	.19275	.18901	.18530	.18162	.17797
30	.21191	.20800	.20412	.20028	19647	.19269	.18895	.18523	.18155	.17790
31	.21184	.20793	.20406	.20021	.19640	.19263	.18888	.18517	.18149	.17784
32	.21178	.20787	.20399	.20015	.19634	.19257	.18882	.18511	.18143	.17778
33	.21171	.20780	.20393	.20009	.19628	.19250	.18876	.18505	.18137	.17772
34	.21165	.20774	.20386	.20002	.19621	.19244	.18870	.18499	.18131	.17766
35	.21158	.20767	.20380	.19996	.19615	.19238	.18864	.18493	.18125	.17760
36	.21152	.20761	.20373	.19989	.19609	.19231	.18857	.18487	.18119	.17754
37	.21145	.20754	.20367	.19983	.19602	.19225	.18851	.18480	.18113	.17748
38	.21139	.20748	.20361	.19977	.19596	.19219	.18845	.18474	.18107	.17742
39	.21132	.20741	.20354	.19970	.19590	.19213	.18839	.18468	.18100	.17736
40	.21126	.20735	.20348	.19964	.19584	.19206	.18833	.18462	.18094	.17730
41	.21119	.20728	.20341	.19958	.19577	.19200	.18826	.18456	.18088	.17724
42	.21112	.20722	.20335	.19951	.19571	.19194	.18820	.18450	.18082	.17718
43	.21106	.20715	.20328	.19945	.19565	.19188	.18814	.18443	.18076	.17712
44	.21099	.20709	.20322	.19938	.19558	.19181	.18808	.18437	.18070	.17706
45	.21093	.20702	.20316	.19932	.19552	.19175	.18802	.18431	.18064	.17700
46	.21086	.20696	.20309	.19926	.19546	.19169	.18795	.18425	.18058	.17694
47	.21080	.20690	.20303	.19919	.19539	.19163	.18789	.18419	.18052	.17688
48	.21073	.20683	.20296	.19913	.19533	.19156	.18783	.18413	.18046	.17682
49	.21067	.20677	.20290	.19907	.19527	.19150	.18777	.18407	.18040	.17676
50	.21060	.20670	.20284	.19900	.19520	.19144	.18771	.18400	.18033	.17669
51	.21054	.20664	.20277	.19894	.19514	.19138	.18764	.18394	.18027	.17663
52	.21047	.20657	.20271	.19888	.19508	.19131	.18758	.18388	.18021	.17657
53	.21041	.20651	.20264	.19881	.19502	.19125	.18752	.18382	.18015	.17651
54	.21034	.20644	.20258	.19875	.19495	.19119	.18746	.18376	.18009	.17645
55	.21028	.20638	.20251	.19869	.19489	.19113	.18740	.18370	.18003	.17639
56	.21021	.20631	.20245	.19862	.19483	.19106	.18733	.18364	.17997	.17633
57	.21015	.20625	.20239	.19856	.19476	.19100	.18727	.18357	.17991	.17627
58	.21008	.20618	.20232	.19849	.19470	.19094	.18721	.18351	.17985	.17621
59	.21001	.20612	.20226	.19843	.19464	.19088	.18715	.18345	.17979	.17615

2h or 2°.	PROP. LOGARITHMS.									2h or 2°.
″	0′	1′	2′	3′	4′	5′	6′	7′	8′	9′
0	.17609	.17249	.16891	.16537	.16185	.15836	.15490	.15147	14806	.14468
1	.17603	.17243	.16885	.16531	.16179	.15830	.15484	.15141	.14801	.14463
2	.17597	.17237	.16879	.16525	.16173	.15825	.15479	.15135	.14795	.14457
3	.17591	.17231	.16873	.16519	.16168	.15819	.15473	.15130	.14789	.14451
4	.17585	.17225	.16868	.16513	.16162	.15813	.15467	.15124	.14784	.14446
5	.17579	.17219	.16862	.16507	.16156	.15807	.15461	.15118	.14778	.14440
6	.17573	.17213	.16856	.16501	.16150	.15802	.15456	.15113	.14772	.14435
7	.17567	.17207	.16850	.16496	.16144	.15796	.15450	.15107	.14767	.14429
8	.17561	.17201	.16844	.16490	.16138	.15790	.15444	.15101	.14761	.14423
9	.17555	.17195	.16838	.16484	.16133	.15784	.15439	.15096	.14755	.14418
10	.17549	.17189	.16832	.16478	.16127	.15778	.15433	.15090	.14750	.14412
11	.17543	.17183	.16826	.16472	.16121	.15773	.15427	.15084	.14744	.14407
12	.17537	.17177	.16820	.16466	.16115	.15767	.15421	.15079	.14738	.14401
13	.17531	.17171	.16814	.16460	.16109	.15761	.15416	.15073	.14733	.14395
14	.17525	.17165	.16808	.16454	.16103	.15755	.15410	.15067	.14727	.14390
15	.17519	.17159	.16802	.16449	.16098	.15749	.15404	.15061	.14722	.14384
16	.17513	.17153	.16796	.16443	.16092	.15744	.15398	.15056	.14716	.14379
17	.17507	.17147	.16791	.16437	.16086	.15738	.15393	.15050	.14710	.14373
18	.17501	.17141	.16785	.16431	.16080	.15732	.15387	.15044	14705	.14367
19	.17495	.17135	.16779	.16425	.16074	.15726	.15381	.15039	.14699	.14362
20	.17489	.17129	.16773	.16419	.16068	.15721	.15375	.15033	14693	.14356
21	.17483	.17123	.16767	.16413	.16063	.15715	.15370	.15027	14688	.14351
22	.17477	.17117	.16761	.16407	.16057	.15709	.15364	15022	.14682	.14345
23	17471	.17111	.16755	.16402	.16051	.15703	15358	.15016	.14676	.14339
24	.17465	.17105	.16749	.16396	.16045	.15697	.15353	.15010	.14671	.14334
25	.17460	.17099	.16743	.16390	.16039	.15692	.15347	.15005	.14665	.14328
26	.17453	.17093	.16737	.16384	.16034	.15686	.15341	.14999	.14659	.14323
27	.17447	.17087	.16731	.16378	.16028	.15680	.15335	.14993	.14654	.14317
28	.17441	.17082	.16725	.16372	.16022	.15674	.15330	.14988	.14648	.14311
29	.17435	.17076	.16720	.16366	.16016	.15669	.15324	.14982	.14643	.14306
30	.17429	.17070	.16714	.16361	.16010	.15663	.15318	.14976	.14637	.14300
31	.17423	.17064	.16708	.16354	.16005	.15657	.15312	.14971	.14631	.14295
32	.17417	.17058	.16702	.16349	.15999	.15651	.15307	.14965	.14626	.14289
33	.17411	.17052	.16696	.16343	.15993	.15646	.15301	.14959	.14620	.14284
34	.17405	.17046	.16690	.16337	.15987	.15640	.15295	.14954	.14614	.14278
35	.17399	.17040	.16684	.16331	.15981	.15634	.15290	.14948	.14609	.14272
36	.17393	.17034	.16678	.16325	.15975	.15628	.15284	.14942	14603	.14267
37	.17387	.17028	.16672	.16320	.15970	.15623	.15278	.14937	.14598	.14261
38	.17381	.17022	.16666	.16314	.15964	.15617	.15272	.14931	.14592	.14256
39	.17375	.17016	.16660	.16308	.15958	.15611	.15267	.14925	.14586	.14250
40	.17369	.17010	.16655	.16302	.15952	.15605	.15261	.14919	.14581	.14244
41	.17363	.17004	16649	.16296	.15946	.15599	15255	.14914	.14575	.14239
42	.17357	.16998	.16643	.16290	.15941	.15594	.15250	.14908	.14569	.14233
43	.17351	.16992	.16637	.16284	.15935	.15588	.15244	.14902	.14564	.14228
44	.17345	.16986	.16631	.16279	.15929	.15582	.15238	14897	.14558	.14222
45	.17339	.16980	.16625	.16273	.15923	.15576	.15232	.14891	.14553	.14217
46	.17333	.16974	.16619	.16267	.15917	.15571	.15227	14886	.14547	.14211
47	.17327	.16968	.16613	.16261	.15912	.15565	.15221	.14880	.14541	.14205
48	.17321	.16963	.16607	.16255	.15906	.15559	.15215	.14874	.14536	.14200
49	.17315	.16957	.16602	.16249	.15900	.15553	.15210	.14869	.14530	.14194
50	.17309	.16951	.16596	.16243	.15894	.15548	.15204	.14863	.14524	.14189
51	.17303	.16945	.16590	.16238	.15888	.15542	.15198	14857	.14519	.14183
52	.17297	.16939	.16584	.16232	.15883	.15536	.15192	.14852	.14513	.14177
53	17291	.16933	.16578	.16226	.15877	.15530	.15187	14846	.14508	.14172
54	.17285	.16927	.16572	.16220	.15871	.15525	.15181	.14840	.14502	.14166
55	.17279	.16921	.16566	.16214	.15865	.15519	.15175	.14835	.14496	.14161
56	.17273	.16915	.16560	.16208	.15859	.15513	.15170	14829	.14491	.14155
57	.17267	.16909	.16554	.16203	.15854	.15507	.15164	.14823	.14485	.14150
58	.17261	.16903	.16549	.16197	.15848	.15502	.15158	.14818	.14480	.14144
59	.17255	.16897	.16543	.16191	.15842	.15496	.15153	.14812	.14474	.14138

2h or 2°.	PROP. LOGARITHMS.									2h or 2°.
"	10′	11′	12′	13′	14′	15′	16′	17′	18′	19′
0	.14133	.13800	.13470	.13142	.12817	.12494	.12173	.11855	.11539	.11226
1	.14127	.13795	.13464	.13137	.12811	.12489	.12168	.11850	.11534	.11221
2	.14122	.13789	.13459	.13131	.12806	.12483	.12163	.11845	.11529	.11215
3	.14116	.13784	.13453	.13126	.12801	.12478	.12157	.11839	.11524	.11210
4	.14111	.13778	.13448	.13120	.12795	.12472	.12152	.11834	.11518	.11205
5	.14105	.13773	.13442	.13115	.12790	.12467	.12147	.11829	.11513	.11200
6	.14100	.13767	.13437	.13109	.12784	.12462	.12141	.11824	.11508	.11195
7	.14094	.13761	.13431	.13104	.12779	.12456	.12136	.11818	.11503	.11189
8	.14088	.13756	.13426	.13099	.12774	.12451	.12131	.11813	.11497	.11184
9	.14083	.13750	.13421	.13093	.12768	.12446	.12125	.11808	.11492	.11179
10	14077	.13745	.13415	.13088	.12763	.12440	.12120	.11802	.11487	.11174
11	.14072	.13739	.13410	.13082	12757	12435	.12115	.11797	.11482	.11169
12	.14066	·13734	.13404	.13077	.12752	.12430	.12110	.11792	.11476	.11163
13	.14061	.13728	.13399	.13071	.12747	.12424	.12104	.11787	·11471	.11158
14	.14055	.13723	.13393	.13066	.12741	.12419	12099	.11781	.11466	.11153
15	.14049	.13717	.13388	.13061	12736	.12414	.12094	.11776	.11461	.11148
16	.14044	.13712	.13382	.13055	12730	.12408	.12088	.11771	.11456	.11143
17	.14038	.13706	.13377	.13050	.12725	.12403	.12083	.11765	.11450	.11137
18	.14033	.13701	.13371	.13044	.12720	.12397	.12078	.11760	.11445	.11132
19	.14027	.13695	.13366	.13039	.12714	.12392	.12072	.11755	.11440	.11127
20	.14022	.13690	.13360	.13033	.12709	.12387	.12067	.11750	.11435	.11122
21	.14016	.13684	.13355	.13028	.12703	.12381	.12062	.11744	.11429	.11117
22	.14011	.13679	.13349	.13023	.12698	.12376	.12056	.11739	.11424	.11111
23	.14005	.13673	.13344	.13017	.12693	.12371	.12051	.11734	.11419	.11106
24	.13999	.13668	.13338	.13012	.12687	.12365	.12046	.11729	11414	.11101
25	.13994	.13662	.13333	.13006	.12682	.12360	.12041	.11723	.11408	.11096
26	.13988	.13657	.13328	.13001	.12677	.12355	.12035	.11718	.11403	.11091
27	.13983	.13651	.13322	.12995	.12671	.12349	.12030	.11713	.11398	.11086
28	.13977	.13646	.13317	.12990	.12666	.12344	.12025	.11708	.11393	.11080
29	.13972	.13640	.13311	.12985	.12660	.12339	12019	.11702	.11387	.11075
30	.13966	.13635	.13306	.12979	.12655	.12333	.12014	.11697	.11382	.11070
31	.13961	.13629	.13300	.12974	.12650	.12328	.12009	.11692	.11377	.11065
32	.13955	.13624	.13295	.12968	.12644	.12323	.12003	.11686	.11372	.11059
33	.13949	.13618	.13289	.12963	.12639	.12317	.11998	.11681	.11367	.11054
34	.13944	.13613	.13284	.12957	.12634	.12312	.11993	.11676	.11361	.11049
35	.13938	.13607	.13278	.12952	.12628	.12307	11987	.11671	.11356	.11044
36	.13933	.13602	.13273	.12947	.12623	.12301	.11982	.11665	.11351	.11039
37	.13927	.13596	.13267	.12941	.12617	.12296	.11977	.11660	.11346	11034
38	.13922	.13591	.13262	.12936	.12612	.12291	.11972	.11655	.11340	.11028
39	.13916	.13585	.13257	.12930	.12607	.12285	.11966	.11650	.11335	.11023
40	.13911	.13580	.13251	.12925	.12601	.12280	.11961	.11644	.11330	.11018
41	.13905	.13574	.13246	.12920	.12596	.12275	.11956	.11639	.11325	.11013
42	.13900	.13569	.13240	.12914	.12590	.12269	.11950	.11634	.11320	.11008
43	.13894	.13563	.13235	.12909	.12585	.12264	.11945	.11629	.11314	.11002
44	.13889	.13558	.13229	.12903	.12580	.12259	.11940	.11623	.11309	.10997
45	.13883	.13552	.13224	.12898	.12574	.12253	.11935	.11618	.11304	.10992
46	.13878	.13547	.13218	.12892	.12569	.12248	.11929	.11613	.11299	.10987
47	.13872	.13541	.13213	.12887	.12564	.12243	.11924	.11608	.11294	.10982
48	.13866	.13536	.13207	.12882	.12558	.12237	.11919	.11602	.11288	.10977
49	.13861	.13530	.13202	.12876	.12553	.12232	.11913	.11597	.11283	.10971
50	.13855	.13525	.13197	.12871	.12548	.12227	.11908	.11592	.11278	10966
51	.13850	.13519	.13191	.12865	.12542	.12221	.11903	.11587	.11273	.10961
52	.13844	.13514	.13186	.12860	.12537	.12216	.11897	.11581	.11267	.10956
53	.13839	.13508	.13180	.12855	.12531	.12211	.11892	.11576	.11262	.10951
54	.13833	.13503	.13175	.12849	.12526	.12205	.11887	.11571	.11257	.10945
55	.13828	.13497	.13169	.12844	.12521	.12200	.11882	.11566	.11252	.10940
56	.13822	.13492	.13164	.12838	.12515	.12195	.11876	.11560	.11247	.10935
57	.13817	.13486	.13158	.12833	.12510	.12189	.11871	.11555	.11241	.10930
58	.13811	.13481	.13153	.12828	.12505	.12184	.11866	.11550	.11236	.10925
59	.13806	.13475	.13148	.12822	.12499	.12179	.11860	.11545	.11231	.10920

2h or 2°.	PROP. LOGARITHMS.									2h or 2°.
″	20′	21′	22′	23′	24′	25′	26′	27′	28′	29′
0	.10914	.10605	.10298	.09994	.09691	.09390	.09092	.08796	.08501	.08209
1	.10909	.10600	.10293	.09989	.09686	.09385	.09087	.08791	.08496	.08204
2	.10904	.10595	.10288	.09984	.09681	.09380	.09082	.08786	.08491	.08199
3	.10899	.10590	.10283	.09978	.09676	.09375	.09077	.08781	.08486	.08194
4	.10894	.10585	.10278	.09973	.09671	.09370	.09072	.08776	.08482	.08189
5	.10889	.10580	.10273	.09968	.09666	.09365	.09067	.08771	.08477	.08184
6	.10883	.10575	.10268	.09963	.09661	.09360	.09062	.08766	.08472	.08179
7	.10878	.10569	.10263	.09958	.09656	.09356	.09057	.08761	.08467	.08175
8	.10873	.10564	.10258	.09953	.09651	.09351	.09052	.08756	.08462	.08170
9	.10868	.10559	.10253	.09948	.09646	.09346	.09047	.08751	.08457	.08165
10	.10863	.10554	.10247	.09943	.09641	.09341	.09042	.08746	.08452	.08160
11	.10858	.10549	.10242	.09938	.09636	.09336	.09037	.08741	.08447	.08155
12	.10852	.10544	.10237	.09933	.09631	.09331	.09033	.08736	.08442	.08150
13	.10847	.10539	.10232	.09928	.09626	.09326	.09028	.08732	.08438	.08146
14	.10842	.10534	.10227	.09923	.09621	.09321	.09023	.08727	.08433	.08141
15	.10837	.10528	.10222	.09918	.09616	.09316	.09018	.08722	.08428	.08136
16	.10832	.10523	.10217	.09913	.09611	.09311	.09013	.08717	.08423	.08131
17	.10827	.10518	.10212	.09908	.09606	.09306	.09008	.08712	.08418	.08126
18	.10821	.10513	.10207	.09903	.09601	.09301	.09003	.08707	.08413	.08121
19	.10816	.10508	.10202	.09898	.09596	.09296	.08998	.08702	.08408	.08116
20	.10811	.10503	.10197	.09893	.09591	.09291	.08993	.08697	.08403	.08112
21	.10806	.10498	.10192	.09887	.09586	.09286	.08988	.08692	.08398	.08107
22	.10801	.10493	.10186	.09882	.09581	.09281	.08983	.08687	.08394	.08102
23	.10796	.10487	.10181	.09877	.09576	.09276	.08978	.08682	.08389	.08097
24	.10791	.10482	.10176	.09872	.09571	.09271	.08973	.08678	.08384	.08092
25	.10785	.10477	.10171	.09867	.09566	.09266	.08968	.08673	.08379	.08087
26	.10780	.10472	.10166	.09862	.09561	.09261	.08963	.08668	.08374	.08083
27	.10775	.10467	.10161	.09857	.09556	.09256	.08958	.08663	.08369	.08078
28	.10770	.10462	.10156	.09852	.09550	.09251	.08953	.08658	.08364	.08073
29	.10765	.10457	.10151	.09847	.09545	.09246	.08948	.08653	.08359	.08068
30	.10760	.10452	.10146	.09842	.09540	.09241	.08943	.08648	.08355	.08063
31	.10754	.10447	.10141	.09837	.09535	.09236	.08939	.08643	.08350	.08058
32	.10749	.10441	.10136	.09832	.09530	.09231	.08934	.08638	.08345	.08053
33	.10744	.10436	.10131	.09827	.09525	.09226	.08929	.08633	.08340	.08049
34	.10739	.10431	.10126	.09822	.09520	.09221	.08924	.08628	.08335	.08044
35	.10734	.10426	.10120	.09817	.09515	.09216	.08919	.08624	.08330	.08039
36	.10729	.10421	.10115	.09812	.09510	.09211	.08914	.08619	.08325	.08034
37	.10724	.10416	.10110	.09807	.09505	.09206	.08909	.08614	.08320	.08029
38	.10718	.10411	.10105	.09802	.09500	.09201	.08904	.08609	.08316	.08024
39	.10713	.10406	.10100	.09797	.09495	.09196	.08899	.08604	.08311	.08020
40	.10708	.10400	.10095	.09792	.09490	.09191	.08894	.08599	.08306	.08015
41	.10703	.10395	.10090	.09787	.09485	.09186	.08889	.08594	.08301	.08010
42	.10698	.10390	.10085	.09782	.09480	.09181	.08884	.08589	.08296	.08005
43	.10693	.10385	.10080	.09777	.09475	.09176	.08879	.08584	.08291	.08000
44	.10688	.10380	.10075	.09772	.09470	.09171	.08874	.08579	.08286	.07995
45	.10682	.10375	.10070	.09766	.09465	.09166	.08869	.08575	.08282	.07991
46	.10677	.10370	.10065	.09761	.09460	.09161	.08865	.08570	.08277	.07986
47	.10672	.10365	.10059	.09756	.09455	.09156	.08860	.08565	.08272	.07981
48	.10667	.10360	.10054	.09751	.09450	.09151	.08855	.08560	.08267	.07976
49	.10662	.10355	.10049	.09746	.09445	.09147	.08850	.08555	.08262	.07971
50	.10657	.10349	.10044	.09741	.09440	.09142	.08845	.08550	.08257	.07966
51	.10652	.10344	.10039	.09736	.09435	.09137	.08840	.08545	.08252	.07962
52	.10646	.10339	.10034	.09731	.09430	.09132	.08835	.08540	.08248	.07957
53	.10641	.10334	.10029	.09726	.09425	.09127	.08830	.08535	.08243	.07952
54	.10636	.10329	.10024	.09721	.09420	.09122	.08825	.08530	.08238	.07947
55	.10631	.10324	.10019	.09716	.09415	.09117	.08820	.08526	.08233	.07942
56	.10626	.10319	.10014	.09711	.09410	.09112	.08815	.08521	.08228	.07937
57	.10621	.10314	.10009	.09706	.09405	.09107	.08810	.08516	.08223	.07933
58	.10616	.10309	.10004	.09701	.09400	.09102	.08805	.08511	.08218	.07928
59	.10610	.10304	.09999	.09696	.09395	.09097	.08800	.08506	.08213	.07923

2h or 2°.	PROP. LOGARITHMS.									2h or 2°.
″	30′	31′	32′	33′	34′	35′	36′	37′	38′	39′
0	.07918	.07630	.07343	.07058	.06775	.06494	.06215	.05937	.05662	.05388
1	.07913	.07625	.07338	.07053	.06770	.06489	.06210	.05933	.05657	.05383
2	.07908	.07620	.07333	.07049	.06766	.06485	.06206	.05928	.05652	.05378
3	.07904	.07615	.07329	.07044	.06761	.06480	.06201	.05923	.05648	.05374
4	.07899	.07610	.07324	.07039	.06756	.06475	.06196	.05919	.05643	.05369
5	.07894	.07606	.07319	.07034	.06752	.06471	.06192	.05914	.05639	.05365
6	.07889	.07601	.07314	.07030	.06747	.06466	.06187	.05910	.05634	.05360
7	.07884	.07596	.07310	.07025	.06742	.06461	.06182	.05905	.05629	.05356
8	.07880	.07591	.07305	.07020	.06738	.06457	.06178	.05900	.05625	.05351
9	.07875	.07586	.07300	.07016	.06733	.06452	.06173	.05896	.05620	.05347
10	.07870	.07582	.07295	.07011	.06728	.06447	.06168	.05891	.05616	.05342
11	.07865	.07577	.07291	.07006	.06724	.06443	.06164	.05887	.05611	.05337
12	.07860	.07572	.07286	.07001	.06719	.06438	.06159	.05882	.05607	.05333
13	.07855	.07567	.07281	.06997	.06714	.06433	.06155	.05877	.05602	.05328
14	.07851	.07562	.07276	.06992	.06709	.06429	.06150	.05873	.05597	.05324
15	.07846	.07558	.07272	.06987	.06705	.06424	.06145	.05868	.05593	.05319
16	.07841	.07553	.07267	06982	.06700	.06419	.06141	.05864	.05588	.05315
17	.07836	.07548	.07262	.06978	.06695	.06415	.06136	.05859	.05584	05310
18	.07831	.07543	.07257	.06973	.06691	.06410	.06131	.05854	.05579	.05306
19	.07827	.07539	.07253	.06968	.06686	.06405	.06127	.05850	.05575	.05301
20	.07822	.07534	.07248	.06964	.06681	.06401	06122	.05845	.05570	.05297
21	.07817	.07529	.07243	.06959	.06677	.06396	.06117	.05841	.05565	.05292
22	.07812	.07524	.07238	.06954	.06672	.06391	.06113	.05836	.05561	.05288
23	.07807	07519	.07234	.06949	.06667	.06387	.06108	.05831	.05556	.05283
24	.07802	.07515	.07229	.06945	.06663	.06382	.06104	.05827	.05552	.05278
25	.07798	.07510	.07224	.06940	.06658	.06377	.06099	.05822	.05547	.05274
26	.07793	.07505	.07219	.06935	.06653	.06373	.06094	.05818	.05543	.05269
27	.07788	.07500	.07215	.06931	.06648	.06368	.06090	.05813	.05538	.05265
28	.07783	.07496	.07210	.06926	.06644	.06364	06085	.05808	.05533	.05260
29	.07778	.07491	07205	.06921	.06639	.06359	.06080	.05804	.05529	.05256
30	07774	.07486	.07200	.06916	.06634	.06354	.06076	.05799	.05524	.05251
31	.07769	.07481	.07196	06912	.06630	.06350	.06071	.05795	.05520	.05247
32	.07764	.07476	.07191	.06907	.06625	.06345	.06067	.05790	.05515	.05242
33	07759	.07472	.07186	.06902	.06620	.06340	.06062	.05785	.05511	.05238
34	.07754	.07467	.07181	.06898	.06616	.06336	.06057	.05781	.05506	.05233
35	.07750	.07462	.07177	.06893	.06611	.06331	06053	.05776	.05501	.05229
36	.07745	.07457	.07172	.06888	.06606	.06326	.06048	.05772	.05497	.05224
37	.07740	.07453	.07167	.06883	.06602	.06322	.06043	.05767	.05492	.05219
38	.07735	.07448	.07162	.06879	.06597	.06317	.06039	.05762	.05488	.05215
39	.07730	.07443	.07158	.06874	.06592	.06312	.06034	.05758	.05483	.05210
40	.07726	.07438	.07153	.06869	.06588	.06308	.06030	.05753	.05479	.05206
41	.07721	.07433	.07148	.06865	.06583	.06303	.06025	.05749	.05474	.05201
42	.07716	.07429	.07143	.06860	.06578	.06298	.06020	.05744	.05470	.05197
43	.07711	.07424	.07139	.06855	.06574	.06294	.06016	.05739	.05465	.05192
44	.07706	.07419	.07134	.06850	.06569	.06289	.06011	.05735	.05460	.05188
45	.07702	.07414	.07129	.06846	.06564	.06284	.06006	.05730	.05456	.05183
46	.07697	.07410	.07124	.06841	.06559	.06280	.06002	.05726	.05451	.05179
47	.07692	.07405	.07120	.06836	.06555	.06275	.05997	.05721	.05447	.05174
48	.07687	.07400	.07115	.06832	.06550	.06271	.05993	.05717	.05442	.05170
49	.07682	.07395	.07110	.06827	.06545	.06266	.05988	.05712	.05438	.05165
50	.07678	.07391	.07105	.06822	.06541	.06261	.05983	.05707	.05433	.05161
51	.07673	.07386	.07101	.06817	.06536	.06257	.05979	.05703	.05429	.05156
52	.07668	.07381	.07096	.06813	.06531	.06252	.05974	.05698	.05424	.05151
53	.07663	.07376	.07091	.06808	.06527	.06247	.05970	.05694	.05419	.05147
54	.07658	.07371	.07087	.06803	.06522	.06243	.05965	.05689	.05415	.05142
55	.07654	.07367	.07082	.06799	.06517	.06238	.05960	.05684	.05410	.05138
56	.07649	.07362	.07077	.06794	.06513	.06233	.05956	.05680	.05406	.05133
57	.07644	07357	.07072	.06789	.06508	.06229	.05951	.05675	.05401	.05129
58	.07639	.07352	.07068	.06784	.06503	.06224	.05947	.05671	.05397	.05124
59	.07634	.07348	.07063	.06780	.06499	.06219	.05942	.05666	.05392	.05120

2h or 2°.	PROP. LOGARITHMS.									2h or 2°.
"	40'	41'	42'	43'	44'	45'	46'	47'	48'	49'
0	.05115	.04845	.04576	.04308	.04043	.03779	.03516	.03256	.02996	.02739
1	.05111	.04840	.04571	.04304	.04038	.03774	.03512	.03251	.02992	.02734
2	.05106	.04836	.04567	.04300	.04034	.03770	.03508	.03247	.02988	.02730
3	.05102	.04831	.04562	.04295	.04030	.03766	.03503	.03243	.02983	.02726
4	.05097	.04827	.04558	.04291	.04025	.03761	.03499	.03238	.02979	.02721
5	.05093	.04822	.04553	.04286	.04021	.03757	.03495	.03234	.02975	.02717
6	.05088	.04818	.04549	.04282	.04016	.03753	.03490	.03230	.02970	.02713
7	.05084	.04813	.04544	.04277	.04012	.03748	.03486	.03225	.02966	.02709
8	.05079	.04809	.04540	.04273	.04008	03744	.03482	.03221	.02962	.02704
9	.05075	.04804	.04536	.04269	.04003	.03739	.03477	.03217	.02958	.02700
10	.05070	.04800	.04531	.04264	.03999	.03735	.03473	.03212	.02953	.02696
11	.05066	.04795	.04527	.04260	.03994	.03731	.03469	.03208	.02949	.02691
12	.05061	.04791	.04522	.04255	.03990	.03726	.03464	.03204	.02945	.02687
13	.05056	.04786	.04518	.04251	.03986	.03722	.03460	.03199	.02940	.02683
14	.05052	.04782	.04513	.04246	.03981	.03717	.03455	.03195	.02936	.02679
15	.05047	.04777	.04509	.04242	.03977	.03713	.03451	.03191	.02932	.02674
16	.05043	.04773	.04504	.04237	.03972	.03709	.03447	.03186	.02927	.02670
17	.05038	.04768	.04500	.04233	.03968	.03704	.03442	.03182	.02923	.02666
18	.05034	.04764	.04495	.04229	.03963	.03700	.03438	.03178	.02919	.02662
19	.05029	.04759	.04491	.04224	.03959	.03696	.03434	.03173	.02916	.02657
20	.05025	.04755	.04486	.04220	.03955	.03691	.03429	.03169	.02910	.02653
21	.05020	.04750	.04482	.04215	.03950	.03687	.03425	.03165	.02906	.02649
22	.05016	.04746	.04478	.04211	.03946	.03682	.03421	.03160	.02902	.02644
23	.05011	.04741	.04473	.04206	.03941	.03678	.03416	.03156	.02897	.02640
24	.05007	.04737	.04469	.04202	.03937	.03674	.03412	.03152	.02893	.02636
25	.05002	.04732	.04464	.04198	.03933	.03669	.03408	.03147	.02889	.02632
26	.04998	.04728	.04460	.04193	.03928	.03665	.03403	.03143	.02884	.02627
27	.04993	.04723	.04455	.04189	.03924	.03661	.03399	.03139	.02880	.02623
28	.04989	.04719	.04451	.04184	.03919	.03656	.03395	.03134	.02876	.02619
29	.04984	.04714	.04446	.04180	.03915	.03652	.03390	.03130	.02872	.02615
30	.04980	.04710	.04442	.04175	.03911	.03647	.03386	.03126	.02867	.02610
31	.04975	.04706	.04437	.04171	.03906	.03643	.03381	.03121	.02863	.02606
32	.04971	.04701	.04433	.04167	.03902	.03639	.03377	.03117	.02859	.02602
33	.04966	.04697	.04429	.04162	.03897	.03634	.03373	.03113	.02854	.02598
34	.04962	.04692	.04424	.04158	.03893	.03630	.03368	.03108	.02850	.02593
35	.04957	.04688	.04420	.04153	.03889	.03626	.03364	.03104	.02846	.02589
36	.04953	.04683	.04415	.04149	.03884	.03621	.03360	.03100	.02841	.02585
37	.04948	.04679	.04411	.04144	.03880	.03617	03355	.03096	.02837	.02580
38	.04944	.04674	.04406	.04140	.03875	.03612	.03351	.03091	.02833	.02576
39	.04939	.04670	.04402	.04136	.03871	.03608	.03347	.03087	.02829	.02572
40	.04935	.04665	.04397	.04131	.03867	.03604	.03342	.03083	.02824	.02568
41	.04930	.04661	.04393	.04127	.03862	.03599	.03338	.03078	.02820	.02563
42	.04926	.04656	.04388	.04122	.03858	.03595	.03334	.03074	.02816	.02559
43	.04921	.04652	.04384	.04118	.03853	.03591	.03329	.03070	.02811	.02555
44	.04917	.04647	.04380	.04114	.03849	.03586	.03325	.03065	.02807	.02551
45	.04912	.04643	.04375	.04109	.03845	.03582	.03321	.03061	.02803	.02546
46	.04908	.04638	.04371	.04105	.03840	.03578	.03316	.03057	.02799	.02542
47	.04903	.04634	.04366	.04100	.03836	.03573	.03312	.03052	.02794	.02538
48	.04899	.04629	.04362	.04096	.03832	.03569	.03308	.03048	.02790	.02533
49	.04894	.04625	.04357	.04091	.03827	.03564	.03303	.03044	.02786	.02529
50	.04890	.04620	.04353	.04087	.03823	.03560	.03299	.03039	.02781	.02525
51	.04885	.04616	.04348	.04083	.03818	.03556	.03295	.03035	.02777	.02521
52	.04881	.04612	.04344	.04078	.03814	.03551	.03290	.03031	.02773	.02516
53	.04876	.04607	.04340	.04074	.03810	.03547	.03286	.03026	.02769	.02512
54	.04872	.04603	.04335	.04069	.03805	.03543	.03282	.03022	.02764	.02508
55	.04867	.04598	.04331	.04065	.03801	.03538	.03277	.03018	.02760	.02504
56	.04863	.04594	.04326	.04061	.03796	.03534	.03273	.03014	.02756	.02499
57	.04858	.04589	.04322	.04056	.03792	.03530	.03269	.03009	.02751	.02495
58	.04854	.04585	.04317	.04052	.03788	.03525	.03264	.03005	.02747	.02491
59	.04849	.04580	.04313	.04047	.03783	.03521	.03260	.03001	.02743	.02487

2h or 2°.	PROP. LOGARITHMS.									2h or 2°.
″	50′	51′	52′	53′	54′	55′	56′	57′	58′	59′
0	.02482	.02228	.01974	.01723	.01472	.01223	.00976	.00730	.00485	.00242
1	.02478	.02223	.01970	.01718	.01468	.01219	.00972	.00726	.00481	.00238
2	.02474	.02219	.01966	.01714	.01464	.01215	.00968	.00722	.00477	.00234
3	.02470	.02215	.01962	.01710	.01460	.01211	.00964	.00718	.00473	.00230
4	.02465	.02211	.01958	.01706	.01456	.01207	.00960	.00714	.00469	.00226
5	.02461	.02206	.01953	.01702	.01452	.01203	.00955	.00709	.00465	.00222
6	.02457	.02202	.01949	.01698	.01447	.01199	.00951	.00705	.00461	.00218
7	.02453	.02198	.01945	.01693	.01443	.01195	.00947	.00701	.00457	.00214
8	.02448	.02194	.01941	.01689	.01439	.01190	.00943	.00697	.00453	.00210
9	.02444	.02190	.01937	.01685	.01435	.01186	.00939	.00693	.00449	.00206
10	.02440	.02185	.01932	.01681	.01431	.01182	.00935	.00689	.00445	.00202
11	.02436	.02181	.01928	.01677	.01427	.01178	.00931	.00685	.00441	.00197
12	.02431	.02177	.01924	.01672	.01422	.01174	.00927	.00681	.00436	.00193
13	.02427	.02173	.01920	.01668	.01418	.01170	.00923	.00677	.00432	.00189
14	.02423	.02168	.01916	.01664	.01414	.01166	.00918	.00673	.00428	.00185
15	.02419	.02164	.01911	.01660	.01410	.01161	.00914	.00669	.00424	.00181
16	.02414	.02160	.01907	.01656	.01406	.01157	.00910	.00665	.00420	.00177
17	.02410	.02156	.01903	.01652	.01402	.01153	.00906	.00660	.00416	.00173
18	.02406	.02152	.01899	.01647	.01398	.01149	.00902	.00656	.00412	.00169
19	.02402	.02147	.01895	.01643	.01393	.01145	.00898	.00652	.00408	.00165
20	.02397	.02143	.01890	.01639	.01389	.01141	.00894	.00648	.00404	.00161
21	.02393	.02139	.01886	.01635	.01385	.01137	.00890	.00644	.00400	.00157
22	.02389	.02135	.01882	.01631	.01381	.01133	.00886	.00640	.00396	.00153
23	.02385	.02130	.01878	.01627	.01377	.01128	.00882	.00636	.00392	.00149
24	.02380	.02126	.01874	.01622	.01373	.01124	.00877	.00632	.00388	.00145
25	.02376	.02122	.01869	.01618	.01368	.01120	.00873	.00628	.00384	.00141
26	.02372	.02118	.01865	.01614	.01364	.01116	.00869	.00624	.00380	.00137
27	.02368	.02114	.01861	.01610	.01360	.01112	.00865	.00620	.00376	.00133
28	.02363	.02109	.01857	.01606	.01356	.01108	.00861	.00616	.00372	.00129
29	.02359	.02105	.01853	.01601	.01352	.01104	.00857	.00611	.00367	.00125
30	.02355	.02101	.01848	.01597	.01348	.01100	.00853	.00607	.00363	.00121
31	.02351	.02097	.01844	.01593	.01344	.01095	.00849	.00603	.00359	.00117
32	.02346	.02092	.01840	.01589	.01339	.01091	.00845	.00599	.00355	.00113
33	.02342	.02088	.01836	.01585	.01335	.01087	.00840	.00595	.00351	.00109
34	.02338	.02084	.01832	.01581	.01331	.01083	.00836	.00591	.00347	.00105
35	.02334	.02080	.01827	.01576	.01327	.01079	.00832	.00587	.00343	.00101
36	.02329	.02076	.01823	.01572	.01323	.01075	.00828	.00583	.00339	.00097
37	.02325	.02071	.01819	.01568	.01319	.01071	.00824	.00579	.00335	.00093
38	.02321	.02067	.01815	.01564	.01315	.01067	.00820	.00575	.00331	.00089
39	.02317	.02063	.01811	.01560	.01310	.01062	.00816	.00571	.00327	.00085
40	.02312	.02059	.01806	.01556	.01306	.01058	.00812	.00567	.00323	.00080
41	.02308	.02054	.01802	.01551	.01302	.01054	.00808	.00563	.00319	.00076
42	.02304	.02050	.01798	.01547	.01298	.01050	.00804	.00559	.00315	.00072
43	.02300	.02046	.01794	.01543	.01294	.01046	.00799	.00554	.00311	.00068
44	.02295	.02042	.01790	.01539	.01290	.01042	.00795	.00550	.00307	.00064
45	.02291	.02038	.01785	.01535	.01286	.01038	.00791	.00546	.00303	.00060
46	.02287	.02033	.01781	.01531	.01281	.01034	.00787	.00542	.00299	.00056
47	.02283	.02029	.01777	.01526	.01277	.01029	.00783	.00538	.00295	.00052
48	.02278	.02025	.01773	.01522	.01273	.01025	.00779	.00534	.00290	.00048
49	.02274	.02021	.01769	.01518	.01269	.01021	.00775	.00530	.00286	.00044
50	.02270	.02017	.01764	.01514	.01265	.01017	.00771	.00526	.00282	.00040
51	.02266	.02012	.01760	.01510	.01261	.01013	.00767	.00522	.00278	.00036
52	.02262	.02008	.01756	.01506	.01257	.01009	.00763	.00518	.00274	.00032
53	.02257	.02004	.01752	.01501	.01252	.01005	.00759	.00514	.00270	.00028
54	.02253	.02000	.01748	.01497	.01248	.01001	.00754	.00510	.00266	.00024
55	.02249	.01995	.01744	.01493	.01244	.00997	.00750	.00506	.00262	.00020
56	.02245	.01991	.01739	.01489	.01240	.00992	.00746	.00502	.00258	.00016
57	.02240	.01987	.01735	.01485	.01236	.00988	.00742	.00497	.00254	.00012
58	.02236	.01983	.01731	.01481	.01232	.00984	.00738	.00493	.00250	.00008
59	.02232	.01979	.01727	.01476	.01228	.00980	.00734	.00489	.00246	.00004

The Correction for Second Differences, in finding the Greenwich Time corresponding to a Reduced Lunar Distance.

Interval.		Mean Difference of the Proportional Logarithms in the Almanac.																							
		2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52
h. m.	h. m.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.
0 0	3 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0 10	2 50	0	0	0	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3
0 20	2 40	0	1	1	1	1	2	2	2	2	2	3	3	3	3	4	4	4	4	5	5	5	5	6	6	6	6
0 30	2 30	0	1	1	2	2	2	2	3	3	3	4	4	5	5	5	6	6	6	7	7	7	8	8	8	9	9
0 40	2 20	0	1	1	2	2	3	3	3	4	4	5	5	6	6	6	7	7	8	8	9	9	10	10	10	11	11
0 50	2 10	1	1	2	2	3	3	4	4	5	5	5	6	6	7	7	8	8	9	9	10	10	11	12	12	13	13
1 0	2 0	1	1	2	2	3	3	4	4	5	6	6	7	7	8	8	9	9	10	10	11	12	12	13	13	14	14
1 10	1 50	1	1	2	2	3	4	4	5	5	6	6	7	8	8	9	9	10	11	11	12	12	13	14	14	15	15
1 20	1 40	1	1	2	3	3	4	4	5	6	6	7	7	8	9	9	10	10	11	12	12	13	14	14	15	15	16
1 30	1 30	1	1	2	3	3	4	4	5	6	6	7	8	8	9	9	10	11	11	12	12	13	14	14	15	16	16

Interval.		Mean Difference of the Proportional Logarithms in the Almanac.																							
		54	56	58	60	62	64	66	68	70	72	74	76	78	80	82	84	86	88	90	92	94	96	98	100	102
h. m.	h. m.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.
0 0	3 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0 10	2 50	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	6	6	6	6	6	6	6	7	7	
0 20	2 40	7	7	7	7	8	8	8	8	9	9	9	9	10	10	10	10	11	11	11	11	12	12	12	12	13
0 30	2 30	9	10	10	10	11	11	12	12	12	13	13	13	14	14	14	14	15	15	16	16	16	17	17	17	18
0 40	2 20	12	12	13	13	13	14	14	15	15	16	16	16	17	17	18	18	19	19	19	20	20	21	21	22	22
0 50	2 10	14	14	15	15	16	16	16	17	17	18	19	19	20	20	21	21	22	22	22	23	23	24	24	25	26
1 0	2 0	15	16	16	17	17	18	18	19	19	20	21	21	22	22	23	23	24	24	25	25	26	27	27	28	28
1 10	1 50	16	17	17	18	18	19	19	20	21	21	22	22	23	24	24	25	25	26	27	27	28	28	29	30	30
1 20	1 40	17	17	18	19	19	20	20	21	21	22	23	23	24	25	25	26	26	27	28	28	29	29	30	31	31
1 30	1 30	17	18	18	19	19	20	21	21	22	23	23	24	24	25	25	26	27	27	28	29	29	30	31	31	32

Interval.		Mean Difference of the Proportional Logarithms in the Almanac.																		
		104	106	108	110	112	114	116	118	120	122	124	126	128	130	132	134	136	138	
h. m.	h. m.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	s.	
0 0	3 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
0 10	2 50	7	7	7	7	7	7	8	8	8	8	8	8	8	8	9	9	9	9	
0 20	2 40	13	13	13	14	14	14	14	15	15	15	15	15	16	16	16	16	17	17	
0 30	2 30	18	18	19	19	19	20	20	20	21	21	21	22	22	22	23	23	24	24	
0 40	2 20	22	23	23	24	24	25	25	25	26	26	27	27	28	28	28	29	29	30	
0 50	2 10	26	26	27	27	28	29	29	29	30	30	31	31	32	32	33	33	34	34	
1 0	2 0	29	29	30	30	31	31	32	33	33	34	34	35	35	36	37	37	38	38	
1 10	1 50	31	31	32	32	33	34	34	35	35	36	37	37	38	38	39	40	40	41	
1 20	1 40	32	33	33	34	34	35	35	36	37	38	38	39	39	40	41	41	42	42	
1 30	1 30	32	33	34	34	35	35	36	36	37	38	39	39	40	40	41	42	42	43	

The Correction is to be *added* to the approximate Greenwich Time when the Proportional Logarithms in the Ephemeris are *decreasing*, and *subtracted* when they are *increasing*.

Natural Sines, Tangents, Secants, &c.

′	0°			1°			2°			′
	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	
0	·0000000	0·0000000	1·0000000	·0174524	0·0174551	1·0001523	·0348995	0·0349208	1·0006095	60
1	·0002909	·0002909	1·0000060	·0177432	·0177460	1·0001574	·0351902	·0352120	1·0006198	59
2	·0005818	·0005818	1·0000002	·0180341	·0180370	1·0001627	·0354809	·0355033	1·0006300	58
3	·0008727	·0008727	1·0000004	·0183249	·0183280	1·0001679	·0357716	·0357945	1·0006404	57
4	·0011636	·0011636	1·0000007	·0186158	·0186190	1·0001733	·0360623	·0360858	1·0006509	56
5	·0014544	·0014544	1·0000011	·0189066	·0189100	1·0001788	·0363530	·0363771	1·0006614	55
6	·0017453	·0017453	1·0000015	·0191974	·0192010	1·0001843	·0366437	·0366683	1·0006721	54
7	·0020362	·0020362	1·0000021	·0194883	·0194920	1·0001900	·0369344	·0369596	1·0006828	53
8	·0023271	·0023271	1·0000027	·0197791	·0197830	1·0001957	·0372251	·0372509	1·0006936	52
9	·0026180	·0026180	1·0000034	·0200699	·0200740	1·0002015	·0375158	·0375422	1·0007045	51
10	·0029089	0·0029089	1·0000042	·0203608	0·0203650	1·0002073	·0378065	0·0378335	1·0007154	50
11	·0031998	·0031998	1·0000051	·0206516	·0206560	1·0002133	·0380971	·0381248	1·0007265	49
12	·0034907	·0034907	1·0000061	·0209424	·0209470	1·0002194	·0383878	·0384161	1·0007376	48
13	·0037815	·0037816	1·0000072	·0212332	·0212380	1·0002255	·0386785	·0387074	1·0007489	47
14	·0040724	·0040725	1·0000083	·0215241	·0215291	1·0002317	·0389692	·0389988	1·0007602	46
15	·0043633	·0043634	1·0000095	·0218149	·0218201	1·0002380	·0392598	·0392901	1·0007716	45
16	·0046542	·0046542	1·0000108	·0221057	·0221111	1·0002444	·0395505	·0395814	1·0007830	44
17	·0049451	·0049451	1·0000122	·0223965	·0224021	1·0002509	·0398411	·0398728	1·0007946	43
18	·0052360	·0052360	1·0000137	·0226873	·0226932	1·0002575	·0401318	·0401641	1·0008063	42
19	·0055268	·0055269	1·0000153	·0229781	·0229842	1·0002641	·0404224	·0404555	1·0008180	41
20	·0058177	0·0058178	1·0000169	·0232690	0·0232753	1·0002708	·0407131	0·0407469	1·0008298	40
21	·0061086	·0061087	1·0000187	·0235598	·0235663	1·0002776	·0410037	·0410383	1·0008417	39
22	·0063995	·0063996	1·0000205	·0238506	·0238574	1·0002845	·0412944	·0413296	1·0008537	38
23	·0066904	·0066905	1·0000224	·0241414	·0241484	1·0002915	·0415850	·0416210	1·0008658	37
24	·0069813	·0069814	1·0000244	·0244322	·0244395	1·0002986	·0418757	·0419124	1·0008779	36
25	·0072721	·0072723	1·0000264	·0247230	·0247305	1·0003058	·0421663	·0422038	1·0008902	35
26	·0075630	·0075632	1·0000286	·0250138	·0250216	1·0003130	·0424569	·0424952	1·0009025	34
27	·0078539	·0078541	1·0000308	·0253046	·0253127	1·0003203	·0427475	·0427866	1·0009149	33
28	·0081448	·0081450	1·0000332	·0255954	·0256038	1·0003277	·0430382	·0430781	1·0009274	32
29	·0084357	·0084360	1·0000356	·0258862	·0258948	1·0003352	·0433288	·0433695	1·0009400	31
30	·0087265	0·0087269	1·0000381	·0261769	0·0261859	1·0003428	·0436194	0·0436609	1·0009527	30
31	·0090174	·0090178	1·0000407	·0264677	·0264770	1·0003505	·0439100	·0439524	1·0009654	29
32	·0093083	·0093087	1·0000433	·0267585	·0267681	1·0003582	·0442006	·0442438	1·0009783	28
33	·0095992	·0095996	1·0000461	·0270493	·0270592	1·0003660	·0444912	·0445353	1·0009912	27
34	·0098900	·0098905	1·0000489	·0273401	·0273503	1·0003739	·0447818	·0448268	1·0010042	26
35	·0101809	·0101814	1·0000518	·0276309	·0276414	1·0003820	·0450724	·0451183	1·0010173	25
36	·0104718	·0104724	1·0000548	·0279216	·0279325	1·0003900	·0453630	·0454097	1·0010305	24
37	·0107627	·0107633	1·0000579	·0282124	·0282236	1·0003982	·0456536	·0457012	1·0010438	23
38	·0110535	·0110542	1·0000611	·0285032	·0285148	1·0004065	·0459442	·0459927	1·0010571	22
39	·0113444	·0113451	1·0000644	·0287940	·0288059	1·0004148	·0462347	·0462842	1·0010705	21
40	·0116353	0·0116361	1·0000677	·0290847	0·0290970	1·0004232	·0465253	0·0465757	1·0010841	20
41	·0119261	·0119270	1·0000711	·0293755	·0293882	1·0004317	·0468159	·0468673	1·0010977	19
42	·0122170	·0122179	1·0000746	·0296662	·0296793	1·0004403	·0471065	·0471588	1·0011114	18
43	·0125079	·0125088	1·0000782	·0299570	·0299705	1·0004490	·0473970	·0474503	1·0011251	17
44	·0127987	·0127998	1·0000819	·0302478	·0302616	1·0004578	·0476876	·0477419	1·0011390	16
45	·0130896	·0130907	1·0000857	·0305385	·0305528	1·0004666	·0479781	·0480334	1·0011529	15
46	·0133805	·0133817	1·0000895	·0308293	·0308439	1·0004756	·0482687	·0483250	1·0011670	14
47	·0136713	·0136726	1·0000935	·0311200	·0311351	1·0004846	·0485592	·0486166	1·0011811	13
48	·0139622	·0139635	1·0000975	·0314108	·0314263	1·0004937	·0488498	·0489082	1·0011953	12
49	·0142530	·0142545	1·0001016	·0317015	·0317174	1·0005029	·0491403	·0491997	1·0012096	11
50	·0145439	0·0145454	1·0001058	·0319922	0·0320086	1·0005121	·0494308	0·0494913	1·0012239	10
51	·0148348	·0148364	1·0001101	·0322830	·0322998	1·0005215	·0497214	·0497829	1·0012384	9
52	·0151256	·0151273	1·0001144	·0325737	·0325910	1·0005309	·0500119	·0500746	1·0012529	8
53	·0154165	·0154183	1·0001189	·0328644	·0328822	1·0005405	·0503024	·0503662	1·0012676	7
54	·0157073	·0157093	1·0001234	·0331552	·0331734	1·0005501	·0505929	·0506578	1·0012823	6
55	·0159982	·0160002	1·0001280	·0334459	·0334646	1·0005598	·0508835	·0509495	1·0012971	5
56	·0162890	·0162912	1·0001327	·0337366	·0337558	1·0005696	·0511740	·0512411	1·0013120	4
57	·0165799	·0165821	1·0001375	·0340274	·0340471	1·0005794	·0514645	·0515328	1·0013269	3
58	·0168707	·0168731	1·0001423	·0343181	·0343383	1·0005894	·0517550	·0518244	1·0013420	2
59	·0171616	·0171641	1·0001473	·0346088	·0346295	1·0005994	·0520455	·0521161	1·0013571	1
60	·0174524	0·0174551	1·0001523	·0348995	0·0349208	1·0006095	·0523360	0·0524078	1·0013723	0
′	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	′
	89°			88°			87°			

Natural Sines, Tangents, Secants, &c.

′	3°			4°			5°			′
	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	
0	·0523360	0·0524078	1·0013723	·0697565	0·0699268	1·0024419	·0871557	0·0874887	1·0038198	60
1	·0526264	·0526995	1·0013877	·0700467	·0702191	1·0024623	·0874455	·0877818	1·0038454	59
2	·0529169	·0529912	1·0014030	·0703368	·0705115	1·0024829	·0877353	·0880749	1·0038711	58
3	·0532074	·0532829	1·0014185	·0706270	·0708038	1·0025035	·0880251	·0883681	1·0038969	57
4	·0534979	·0535746	1·0014341	·0709171	·0710961	1·0025241	·0883148	·0886612	1·0039227	56
5	·0537883	·0538663	1·0014497	·0712073	·0713885	1·0025449	·0886046	·0889544	1·0039486	55
6	·0540788	·0541581	1·0014655	·0714974	·0716809	1·0025658	·0888943	·0892476	1·0039747	54
7	·0543693	·0544498	1·0014813	·0717876	·0719733	1·0025867	·0891840	·0895408	1·0040008	53
8	·0546597	·0547416	1·0014972	·0720777	·0722657	1·0026078	·0894738	·0898341	1·0040270	52
9	·0549502	·0550333	1·0015132	·0723678	·0725581	1·0026289	·0897635	·0901273	1·0040533	51
10	·0552406	0·0553251	1·0015293	·0726580	0·0728505	1·0026501	·0900532	0·0904206	1·0040796	50
11	·0555311	·0556169	1·0015454	·0729481	·0731430	1·0026714	·0903429	·0907138	1·0041061	49
12	·0558215	·0559087	1·0015617	·0732382	·0734354	1·0026928	·0906326	·0910071	1·0041326	48
13	·0561119	·0562005	1·0015780	·0735283	·0737279	1·0027142	·0909223	·0913004	1·0041592	47
14	·0564024	·0564923	1·0015944	·0738184	·0740203	1·0027358	·0912119	·0915938	1·0041859	46
15	·0566928	·0567841	1·0016109	·0741085	·0743128	1·0027574	·0915016	·0918871	1·0042127	45
16	·0569832	·0570759	1·0016275	·0743986	·0746053	1·0027791	·0917913	·0921804	1·0042396	44
17	·0572736	·0573678	1·0016442	·0746887	·0748979	1·0028009	·0920809	·0924738	1·0042666	43
18	·0575640	·0576596	1·0016609	·0749787	·0751904	1·0028228	·0923706	·0927672	1·0042937	42
19	·0578544	·0579515	1·0016778	·0752688	·0754829	1·0028448	·0926602	·0930606	1·0043208	41
20	·0581448	0·0582434	1·0016947	·0755589	0·0757755	1·0028669	·0929499	0·0933540	1·0043480	40
21	·0584352	·0585352	1·0017117	·0758489	·0760680	1·0028890	·0932395	·0936474	1·0043753	39
22	·0587256	·0588271	1·0017288	·0761390	·0763606	1·0029112	·0935291	·0939409	1·0044028	38
23	·0590160	·0591190	1·0017460	·0764290	·0766532	1·0029336	·0938187	·0942344	1·0044302	37
24	·0593064	·0594109	1·0017633	·0767190	·0769458	1·0029560	·0941083	·0945278	1·0044578	36
25	·0595967	·0597029	1·0017806	·0770091	·0772384	1·0029785	·0943979	·0948213	1·0044855	35
26	·0598871	·0599948	1·0017981	·0772991	·0775311	1·0030010	·0946875	·0951148	1·0045132	34
27	·0601775	·0602867	1·0018156	·0775891	·0778237	1·0030237	·0949771	·0954084	1·0045411	33
28	·0604678	·0605787	1·0018332	·0778791	·0781164	1·0030464	·0952666	·0957019	1·0045690	32
29	·0607582	·0608706	1·0018509	·0781691	·0784090	1·0030693	·0955562	·0959955	1·0045970	31
30	·0610485	0·0611626	1·0018687	·0784591	0·0787017	1·0030922	·0958458	0·0962890	1·0046251	30
31	·0613389	·0614546	1·0018866	·0787491	·0789944	1·0031152	·0961353	·0965826	1·0046533	29
32	·0616292	·0617466	1·0019045	·0790391	·0792871	1·0031383	·0964248	·0968763	1·0046815	28
33	·0619196	·0620386	1·0019225	·0793290	·0795798	1·0031615	·0967144	·0971699	1·0047099	27
34	·0622099	·0623306	1·0019407	·0796190	·0798726	1·0031847	·0970039	·0974635	1·0047383	26
35	·0625002	·0626226	1·0019589	·0799090	·0801653	1·0032081	·0972934	·0977572	1·0047669	25
36	·0627905	·0629147	1·0019772	·0801989	·0804581	1·0032315	·0975829	·0980509	1·0047955	24
37	·0630808	·0632067	1·0019956	·0804889	·0807509	1·0032551	·0978724	·0983446	1·0048242	23
38	·0633711	·0634988	1·0020140	·0807788	·0810437	1·0032787	·0981619	·0986383	1·0048530	22
39	·0636614	·0637908	1·0020326	·0810687	·0813365	1·0033024	·0984514	·0989320	1·0048819	21
40	·0639517	0·0640829	1·0020512	·0813587	0·0816293	1·0033261	·0987408	0·0992257	1·0049108	20
41	·0642420	·0643750	1·0020699	·0816486	·0819221	1·0033500	·0990303	·0995194	1·0049399	19
42	·0645323	·0646671	1·0020887	·0819385	·0822150	1·0033740	·0993197	·0998133	1·0049690	18
43	·0648226	·0649592	1·0021076	·0822284	·0825078	1·0033980	·0996092	·1001071	1·0049982	17
44	·0651129	·0652513	1·0021266	·0825183	·0828007	1·0034221	·0998986	·1004009	1·0050275	16
45	·0654031	·0655435	1·0021457	·0828082	·0830936	1·0034463	·1001881	·1006947	1·0050569	15
46	·0656934	·0658356	1·0021648	·0830981	·0833865	1·0034706	·1004775	·1009886	1·0050864	14
47	·0659836	·0661278	1·0021841	·0833880	·0836794	1·0034950	·1007669	·1012824	1·0051160	13
48	·0662739	·0664199	1·0022034	·0836778	·0839723	1·0035195	·1010563	·1015763	1·0051456	12
49	·0665641	·0667121	1·0022228	·0839677	·0842653	1·0035440	·1013457	·1018702	1·0051754	11
50	·0668544	0·0670043	1·0022423	·0842576	0·0845583	1·0035687	·1016351	0·1021641	1·0052052	10
51	·0671446	·0672965	1·0022619	·0845474	·0848512	1·0035934	·1019245	·1024580	1·0052351	9
52	·0674349	·0675887	1·0022815	·0848373	·0851442	1·0036182	·1022138	·1027520	1·0052651	8
53	·0677251	·0678809	1·0023013	·0851271	·0854372	1·0036431	·1025032	·1030460	1·0052952	7
54	·0680153	·0681732	1·0023211	·0854169	·0857302	1·0036681	·1027925	·1033399	1·0053254	6
55	·0683055	·0684654	1·0023410	·0857067	·0860233	1·0036932	·1030819	·1036340	1·0053557	5
56	·0685957	·0687577	1·0023610	·0859966	·0863163	1·0037183	·1033712	·1039280	1·0053860	4
57	·0688859	·0690499	1·0023811	·0862864	·0866094	1·0037436	·1036605	·1042220	1·0054164	3
58	·0691761	·0693422	1·0024013	·0865762	·0869025	1·0037689	·1039499	·1045161	1·0054470	2
59	·0694663	·0696345	1·0024216	·0868660	·0871956	1·0037943	·1042392	·1048101	1·0054776	1
60	·0697565	0·0699268	1·0024419	·0871557	0·0874887	1·0038198	·1045285	0·1051042	1·0055083	0
′	Cosines.	Cotangents.	Cosecants	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	′
		86°			85°			84°		

Natural Sines, Tangents, Secants, &c.

′	6°			7°			8°			′
	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	
0	·1045285	0·1051042	1·0055083	·1218693	0·1227846	1·0075098	·1391731	0·1405408	1·0098276	60
1	·1048178	·1053983	1·0055391	·1221581	·1230798	1·0075459	·1394612	·1408375	1·0098689	59
2	·1051070	·1056925	1·0055699	·1224468	·1233752	1·0075820	·1397492	·1411342	1·0099103	58
3	·1053963	·1059866	1·0056009	·1227355	·1236705	1·0076182	·1400372	·1414308	1·0099518	57
4	·1056856	·1062808	1·0056319	·1230241	·1239658	1·0076545	·1403252	·1417276	1·0099934	56
5	·1059748	·1065750	1·0056631	·1233128	·1242612	1·0076908	·1406132	·1420243	1·0100351	55
6	·1062641	·1068692	1·0056943	·1236015	·1245566	1·0077273	·1409012	·1423211	1·0100769	54
7	·1065533	·1071634	1·0057256	·1238901	·1248520	1·0077639	·1411892	·1426179	1·0101187	53
8	·1068425	·1074576	1·0057570	·1241788	·1251474	1·0078005	·1414772	·1429147	1·0101607	52
9	·1071318	·1077519	1·0057885	·1244674	·1254429	1·0078372	·1417651	·1432115	1·0102027	51
10	·1074210	0·1080462	1·0058200	·1247560	0·1257384	1·0078741	·1420531	0·1435084	1·0102449	50
11	·1077102	·1083405	1·0058517	·1250446	·1260339	1·0079110	·1423410	·1438053	1·0102871	49
12	·1079994	·1086348	1·0058834	·1253332	·1263294	1·0079480	·1426289	·1441022	1·0103294	48
13	·1082885	·1089291	1·0059153	·1256218	·1266249	1·0079851	·1429168	·1443991	1·0103718	47
14	·1085777	·1092234	1·0059472	·1259104	·1269205	1·0080222	·1432047	·1446961	1·0104143	46
15	·1088669	·1095178	1·0059792	·1261990	·1272161	1·0080595	·1434926	·1449931	1·0104568	45
16	·1091560	·1098122	1·0060113	·1264875	·1275117	1·0080968	·1437805	·1452901	1·0104995	44
17	·1094452	·1101066	1·0060435	·1267761	·1278073	1·0081343	·1440684	·1455872	1·0105422	43
18	·1097343	·1104010	1·0060757	·1270646	·1281030	1·0081718	·1443562	·1458842	1·0105851	42
19	·1100234	·1106955	1·0061081	·1273531	·1283986	1·0082094	·1446440	·1461813	1·0106280	41
20	·1103126	0·1109899	1·0061405	·1276416	0·1286943	1·0082471	·1449319	0·1464784	1·0106710	40
21	·1106017	·1112844	1·0061731	·1279302	·1289900	1·0082849	·1452197	·1467756	1·0107141	39
22	·1108908	·1115789	1·0062057	·1282186	·1292858	1·0083228	·1455075	·1470727	1·0107573	38
23	·1111799	·1118734	1·0062384	·1285071	·1295815	1·0083607	·1457953	·1473699	1·0108006	37
24	·1114689	·1121680	1·0062712	·1287956	·1298773	1·0083988	·1460830	·1476672	1·0108440	36
25	·1117580	·1124625	1·0063040	·1290841	·1301731	1·0084369	·1463708	·1479644	1·0108875	35
26	·1120471	·1127571	1·0063370	·1293725	·1304690	1·0084752	·1466585	·1482617	1·0109310	34
27	·1123361	·1130517	1·0063701	·1296609	·1307648	1·0085135	·1469463	·1485590	1·0109747	33
28	·1126252	·1133463	1·0064032	·1299494	·1310607	1·0085519	·1472340	·1488563	1·0110184	32
29	·1129142	·1136410	1·0064364	·1302378	·1313566	1·0085904	·1475217	·1491536	1·0110622	31
30	·1132032	0·1139356	1·0064697	·1305262	0·1316525	1·0086290	·1478094	0·1494510	1·0111061	30
31	·1134922	·1142303	1·0065031	·1308146	·1319484	1·0086676	·1480971	·1497484	1·0111501	29
32	·1137812	·1145250	1·0065366	·1311030	·1322444	1·0087064	·1483848	·1500458	1·0111942	28
33	·1140702	·1148197	1·0065702	·1313913	·1325404	1·0087452	·1486724	·1503433	1·0112384	27
34	·1143592	·1151144	1·0066039	·1316797	·1328364	1·0087842	·1489601	·1506408	1·0112827	26
35	·1146482	·1154092	1·0066376	·1319681	·1331324	1·0088232	·1492477	·1509383	1·0113270	25
36	·1149372	·1157039	1·0066714	·1322564	·1334285	1·0088623	·1495353	·1512358	1·0113715	24
37	·1152261	·1159987	1·0067054	·1325447	·1337246	1·0089015	·1498230	·1515333	1·0114160	23
38	·1155151	·1162936	1·0067394	·1328330	·1340207	1·0089408	·1501106	·1518309	1·0114606	22
39	·1158040	·1165884	1·0067735	·1331213	·1343168	1·0089802	·1503981	·1521285	1·0115054	21
40	·1160929	0·1168832	1·0068077	·1334096	0·1346129	1·0090196	·1506857	0·1524262	1·0115502	20
41	·1163818	·1171781	1·0068419	·1336979	·1349091	1·0090592	·1509733	·1527238	1·0115951	19
42	·1166707	·1174730	1·0068763	·1339862	·1352053	1·0090988	·1512608	·1530215	1·0116400	18
43	·1169596	·1177679	1·0069108	·1342744	·1355015	1·0091386	·1515484	·1533192	1·0116851	17
44	·1172485	·1180628	1·0069453	·1345627	·1357978	1·0091784	·1518359	·1536170	1·0117303	16
45	·1175374	·1183578	1·0069799	·1348509	·1360940	1·0092183	·1521234	·1539147	1·0117755	15
46	·1178263	·1186528	1·0070146	·1351392	·1363903	1·0092583	·1524109	·1542125	1·0118209	14
47	·1181151	·1189478	1·0070494	·1354274	·1366866	1·0092984	·1526984	·1545103	1·0118663	13
48	·1184040	·1192428	1·0070843	·1357156	·1369830	1·0093386	·1529858	·1548082	1·0119118	12
49	·1186928	·1195378	1·0071193	·1360038	·1372793	1·0093788	·1532733	·1551061	1·0119575	11
50	·1189816	0·1198329	1·0071544	·1362919	0·1375757	1·0094192	·1535607	0·1554040	1·0120032	10
51	·1192704	·1201279	1·0071895	·1365801	·1378721	1·0094596	·1538482	·1557019	1·0120489	9
52	·1195593	·1204230	1·0072248	·1368683	·1381685	1·0095001	·1541356	·1559998	1·0120948	8
53	·1198481	·1207182	1·0072601	·1371564	·1384650	1·0095408	·1544230	·1562978	1·0121408	7
54	·1201368	·1210133	1·0072955	·1374445	·1387615	1·0095815	·1547104	·1565958	1·0121869	6
55	·1204256	·1213085	1·0073310	·1377327	·1390580	1·0096223	·1549978	·1568939	1·0122330	5
56	·1207144	·1216036	1·0073666	·1380208	·1393545	1·0096631	·1552851	·1571919	1·0122793	4
57	·1210031	·1218988	1·0074023	·1383089	·1396510	1·0097041	·1555725	·1574900	1·0123256	3
58	·1212919	·1221941	1·0074380	·1385970	·1399476	1·0097452	·1558598	·1577881	1·0123720	2
59	·1215806	·1224893	1·0074739	·1388850	·1402442	1·0097863	·1561472	·1580863	1·0124185	1
60	·1218693	0·1227846	1·0075098	·1391731	0·1405408	1·0098276	·1564345	0·1583844	1·0124651	0
′	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	′
	83°			82°			81°			

Natural Sines, Tangents, Secants, &c.

′	9°			10°			11°			′
	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	
0	·1564345	0·1583844	1·0124651	·1736482	0·1763270	1·0154266	·1908090	0·1943803	1·0187167	60
1	·1567218	·1586826	1·0125118	·1739346	·1766269	1·0154787	·1910945	·1946822	1·0187743	59
2	·1570091	·1589809	1·0125586	·1742211	·1769269	1·0155310	·1913801	·1949841	1·0188321	58
3	·1572963	·1592791	1·0126055	·1745075	·1772269	1·0155833	·1916656	·1952861	1·0188899	57
4	·1575836	·1595774	1·0126524	·1747939	·1775270	1·0156357	·1919510	·1955881	1·0189478	56
5	·1578708	·1598757	1·0126995	·1750803	·1778270	1·0156882	·1922365	·1958901	1·0190059	55
6	·1581581	·1601740	1·0127466	·1753667	·1781271	1·0157408	·1925220	·1961922	1·0190640	54
7	·1584453	·1604724	1·0127939	·1756531	·1784273	1·0157934	·1928074	·1964943	1·0191222	53
8	·1587325	·1607708	1·0128412	·1759395	·1787274	1·0158462	·1930928	·1967964	1·0191805	52
9	·1590197	·1610692	1·0128886	·1762258	·1790276	1·0158991	·1933782	·1970986	1·0192389	51
10	·1593069	0·1613677	1·0129361	·1765121	0·1793279	1·0159520	·1936636	0·1974008	1·0192973	50
11	·1595940	·1616662	1·0129837	·1767984	·1796281	1·0160050	·1939490	·1977031	1·0193559	49
12	·1598812	·1619647	1·0130314	·1770847	·1799284	1·0160582	·1942344	·1980053	1·0194146	48
13	·1601683	·1622632	1·0130791	·1773710	·1802287	1·0161114	·1945197	·1983076	1·0194734	47
14	·1604555	·1625618	1·0131270	·1776573	·1805291	1·0161647	·1948050	·1986100	1·0195322	46
15	·1607426	·1628603	1·0131750	·1779435	·1808295	1·0162181	·1950903	·1989124	1·0195912	45
16	·1610297	·1631590	1·0132230	·1782298	·1811299	1·0162716	·1953756	·1992148	1·0196502	44
17	·1613167	·1634576	1·0132711	·1785160	·1814303	1·0163252	·1956609	·1995172	1·0197093	43
18	·1616038	·1637563	1·0133194	·1788022	·1817308	1·0163789	·1959461	·1998197	1·0197686	42
19	·1618909	·1640550	1·0133677	·1790884	·1820313	1·0164327	·1962314	·2001222	1·0198279	41
20	·1621779	0·1643537	1·0134161	·1793746	0·1823319	1·0164865	·1965166	0·2004248	1·0198873	40
21	·1624650	·1646525	1·0134646	·1796607	·1826324	1·0165405	·1968018	·2007274	1·0199468	39
22	·1627520	·1649513	1·0135132	·1799469	·1829330	1·0165946	·1970870	·2010300	1·0200064	38
23	·1630390	·1652501	1·0135618	·1802330	·1832337	1·0166487	·1973722	·2013327	1·0200661	37
24	·1633260	·1655489	1·0136106	·1805191	·1835343	1·0167029	·1976573	·2016354	1·0201259	36
25	·1636129	·1658478	1·0136595	·1808052	·1838350	1·0167573	·1979425	·2019381	1·0201858	35
26	·1638999	·1661467	1·0137084	·1810913	·1841358	1·0168117	·1982276	·2022409	1·0202457	34
27	·1641868	·1664456	1·0137574	·1813774	·1844365	1·0168662	·1985127	·2025437	1·0203058	33
28	·1644738	·1667446	1·0138066	·1816635	·1847373	1·0169208	·1987978	·2028465	1·0203660	32
29	·1647607	·1670436	1·0138558	·1819495	·1850382	1·0169755	·1990829	·2031494	1·0204262	31
30	·1650476	0·1673426	1·0139051	·1822355	0·1853390	1·0170303	·1993679	0·2034523	1·0204866	30
31	·1653345	·1676417	1·0139545	·1825215	·1856399	1·0170851	·1996530	·2037552	1·0205470	29
32	·1656214	·1679407	1·0140040	·1828075	·1859409	1·0171401	·1999380	·2040582	1·0206075	28
33	·1659082	·1682398	1·0140536	·1830935	·1862418	1·0171952	·2002230	·2043612	1·0206682	27
34	·1661951	·1685390	1·0141032	·1833795	·1865428	1·0172503	·2005080	·2046643	1·0207289	26
35	·1664819	·1688381	1·0141530	·1836654	·1868439	1·0173056	·2007930	·2049674	1·0207897	25
36	·1667687	·1691373	1·0142029	·1839514	·1871449	1·0173609	·2010779	·2052705	1·0208506	24
37	·1670556	·1694366	1·0142528	·1842373	·1874460	1·0174163	·2013629	·2055737	1·0209116	23
38	·1673423	·1697358	1·0143028	·1845232	·1877471	1·0174719	·2016478	·2058769	1·0209727	22
39	·1676291	·1700351	1·0143530	·1848091	·1880483	1·0175275	·2019327	·2061801	1·0210339	21
40	·1679159	0·1703344	1·0144032	·1850949	0·1883495	1·0175832	·2022176	0·2064834	1·0210952	20
41	·1682026	·1706338	1·0144535	·1853808	·1886507	1·0176390	·2025024	·2067867	1·0211566	19
42	·1684894	·1709331	1·0145039	·1856666	·1889520	1·0176949	·2027873	·2070900	1·0212180	18
43	·1687761	·1712325	1·0145544	·1859524	·1892533	1·0177509	·2030721	·2073934	1·0212796	17
44	·1690628	·1715320	1·0146050	·1862382	·1895546	1·0178069	·2033569	·2076968	1·0213413	16
45	·1693495	·1718314	1·0146556	·1865240	·1898559	1·0178631	·2036418	·2080003	1·0214030	15
46	·1696362	·1721309	1·0147064	·1868098	·1901573	1·0179194	·2039265	·2083038	1·0214649	14
47	·1699228	·1724304	1·0147572	·1870956	·1904587	1·0179757	·2042113	·2086073	1·0215268	13
48	·1702095	·1727300	1·0148082	·1873813	·1907602	1·0180321	·2044961	·2089109	1·0215888	12
49	·1704961	·1730296	1·0148592	·1876670	·1910617	1·0180887	·2047808	·2092145	1·0216510	11
50	·1707828	0·1733292	1·0149103	·1879528	0·1913632	1·0181453	·2050655	0·2095181	1·0217132	10
51	·1710694	·1736288	1·0149616	·1882385	·1916648	1·0182020	·2053502	·2098218	1·0217755	9
52	·1713560	·1739285	1·0150129	·1885241	·1919664	1·0182588	·2056349	·2101255	1·0218379	8
53	·1716425	·1742282	1·0150643	·1888098	·1922680	1·0183158	·2059195	·2104293	1·0219004	7
54	·1719291	·1745279	1·0151158	·1890954	·1925696	1·0183728	·2062042	·2107331	1·0219630	6
55	·1722156	·1748277	1·0151673	·1893811	·1928713	1·0184298	·2064888	·2110369	1·0220257	5
56	·1725022	·1751275	1·0152190	·1896667	·1931731	1·0184870	·2067734	·2113407	1·0220885	4
57	·1727887	·1754273	1·0152708	·1899523	·1934748	1·0185443	·2070580	·2116446	1·0221514	3
58	·1730752	·1757272	1·0153226	·1902379	·1937766	1·0186017	·2073426	·2119486	1·0222144	2
59	·1733617	·1760271	1·0153746	·1905234	·1940784	1·0186591	·2076272	·2122525	1·0222774	1
60	·1736482	0·1763270	1·0154266	·1908090	0·1943803	1·0187167	·2079117	0·2125566	1·0223406	0
′	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	′
	80°			79°			78°			

Natural Sines, Tangents, Secants, &c.

′	12°			13°			14°			′
	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	
0	·2079117	0·2125566	1·0223406	·2249511	0·2308682	1·0263041	·2419219	0·2493280	1·0306136	60
1	·2081962	·2128606	1·0224039	·2252345	·2311746	1·0263731	·2422041	·2496370	1·0306884	59
2	·2084807	·2131647	1·0224672	·2255179	·2314811	1·0264421	·2424863	·2499460	1·0307633	58
3	·2087652	·2134688	1·0225307	·2258013	·2317876	1·0265113	·2427685	·2502551	1·0308383	57
4	·2090497	·2137730	1·0225942	·2260846	·2320941	1·0265806	·2430507	·2505642	1·0309134	56
5	·2093341	·2140772	1·0226578	·2263680	·2324007	1·0266499	·2433329	·2508734	1·0309886	55
6	·2096186	·2143814	1·0227216	·2266513	·2327073	1·0267194	·2436150	·2511826	1·0310639	54
7	·2099030	·2146857	1·0227854	·2269346	·2330140	1·0267889	·2438971	·2514919	1·0311393	53
8	·2101874	·2149900	1·0228493	·2272179	·2333207	1·0268586	·2441792	·2518012	1·0312147	52
9	·2104718	·2152944	1·0229133	·2275012	·2336274	1·0269283	·2444613	·2521106	1·0312903	51
10	·2107561	0·2155988	1·0229774	·2277844	0·2339342	1·0269982	·2447433	0·2524200	1·0313660	50
11	·2110405	·2159032	1·0230416	·2280677	·2342410	1·0270681	·2450254	·2527294	1·0314418	49
12	·2113248	·2162077	1·0231059	·2283509	·2345479	1·0271381	·2453074	·2530389	1·0315177	48
13	·2116091	·2165122	1·0231703	·2286341	·2348548	1·0272082	·2455894	·2533484	1·0315936	47
14	·2118934	·2168167	1·0232348	·2289172	·2351617	1·0272785	·2458713	·2536580	1·0316697	46
15	·2121777	·2171213	1·0232994	·2292004	·2354687	1·0273488	·2461533	·2539676	1·0317459	45
16	·2124619	·2174259	1·0233641	·2294835	·2357758	1·0274192	·2464352	·2542773	1·0318222	44
17	·2127462	·2177306	1·0234288	·2297666	·2360829	1·0274897	·2467171	·2545870	1·0318985	43
18	·2130304	·2180353	1·0234937	·2300497	·2363900	1·0275603	·2469990	·2548968	1·0319750	42
19	·2133146	·2183400	1·0235587	·2303328	·2366971	1·0276310	·2472809	·2552066	1·0320516	41
20	·2135988	0·2186448	1·0236237	·2306159	0·2370044	1·0277018	·2475627	0·2555165	1·0321282	40
21	·2138829	·2189496	1·0236889	·2308989	·2373116	1·0277727	·2478445	·2558264	1·0322050	39
22	·2141671	·2192544	1·0237541	·2311819	·2376189	1·0278437	·2481263	·2561363	1·0322818	38
23	·2144512	·2195593	1·0238195	·2314649	·2379262	1·0279148	·2484081	·2564463	1·0323588	37
24	·2147353	·2198643	1·0238849	·2317479	·2382336	1·0279860	·2486899	·2567564	1·0324359	36
25	·2150194	·2201692	1·0239504	·2320309	·2385410	1·0280573	·2489716	·2570664	1·0325130	35
26	·2153035	·2204742	1·0240161	·2323138	·2388485	1·0281287	·2492533	·2573766	1·0325903	34
27	·2155876	·2207793	1·0240818	·2325967	·2391560	1·0282002	·2495350	·2576868	1·0326676	33
28	·2158716	·2210844	1·0241476	·2328796	·2394635	1·0282717	·2498167	·2579970	1·0327451	32
29	·2161556	·2213895	1·0242135	·2331625	·2397711	1·0283434	·2500984	·2583073	1·0328227	31
30	2164396	0·2216947	1·0242795	·2334454	0·2400788	1·0284152	·2503800	0·2586176	1·0329003	30
31	·2167236	·2219999	1·0243456	·2337282	·2403864	1·0284871	·2506616	·2589280	1·0329781	29
32	·2170076	·2223051	1·0244118	·2340110	·2406942	1·0285590	·2509432	·2592384	1·0330559	28
33	·2172915	·2226104	1·0244781	·2342938	·2410019	1·0286311	·2512248	·2595488	1·0331339	27
34	·2175754	·2229157	1·0245445	·2345766	·2413097	1·0287033	·2515063	·2598593	1·0332119	26
35	·2178593	·2232211	1·0246110	·2348594	·2416176	1·0287755	·2517879	·2601699	1·0332901	25
36	·2181432	·2235265	1·0246776	·2351421	·2419255	1·0288479	·2520694	·2604805	1·0333683	24
37	·2184271	·2238319	1·0247442	·2354248	·2422334	1·0289203	·2523508	·2607911	1·0334467	23
38	·2187110	·2241374	1·0248110	·2357075	·2425414	1·0289929	·2526323	·2611018	1·0335251	22
39	·2189948	·2244429	1·0248779	·2359902	·2428494	1·0290655	·2529137	·2614126	1·0336037	21
40	·2192786	0·2247485	1·0249448	·2362729	0·2431575	1·0291383	·2531952	0·2617234	1·0336823	20
41	·2195624	·2250541	1·0250119	·2365555	·2434656	1·0292111	·2534766	·2620342	1·0337611	19
42	·2198462	·2253597	1·0250790	·2368381	·2437737	1·0292840	·2537579	·2623451	1·0338399	18
43	·2201300	·2256654	1·0251463	·2371207	·2440819	1·0293571	·2540393	·2626560	1·0339188	17
44	·2204137	·2259711	1·0252136	·2374033	·2443902	1·0294302	·2543206	·2629670	1·0339979	16
45	·2206974	·2262769	1·0252811	·2376859	·2446984	1·0295034	·2546019	·2632780	1·0340770	15
46	·2209811	·2265827	1·0253486	·2379684	·2450068	1·0295768	·2548832	·2635891	1·0341563	14
47	·2212648	·2268885	1·0254162	·2382510	·2453151	1·0296502	·2551645	·2639002	1·0342356	13
48	·2215485	·2271944	1·0254839	·2385335	·2456236	1·0297237	·2554458	·2642114	1·0343151	12
49	·2218321	·2275003	1·0255518	·2388159	·2459320	1·0297973	·2557270	·2645226	1·0343946	11
50	·2221158	0·2278063	1·0256197	·2390984	0·2462405	1·0298711	·2560082	0·2648339	1·0344743	10
51	·2223994	·2281123	1·0256877	·2393808	·2465491	1·0299449	·2562894	·2651452	1·0345540	9
52	·2226830	·2284184	1·0257558	·2396633	·2468577	1·0300188	·2565705	·2654566	1·0346338	8
53	·2229666	·2287244	1·0258240	·2399457	·2471663	1·0300928	·2568517	·2657680	1·0347138	7
54	·2232501	·2290306	1·0258923	·2402280	·2474750	1·0301669	·2571328	·2660794	1·0347938	6
55	·2235337	·2293367	1·0259607	·2405104	·2477837	1·0302411	·2574139	·2663909	1·0348740	5
56	·2238172	·2296429	1·0260292	·2407927	·2480925	1·0303154	·2576950	·2667025	1·0349542	4
57	·2241007	·2299492	1·0260978	·2410751	·2484013	1·0303898	·2579760	·2670141	1·0350346	3
58	·2243842	·2302555	1·0261665	·2413574	·2487102	1·0304643	·2582570	·2673257	1·0351150	2
59	·2246676	·2305618	1·0262352	·2416396	·2490191	1·0305389	·2585381	·2676374	1·0351955	1
60	·2249511	0·2308682	1·0263041	·2419219	0·2493280	1·0306136	·2588190	0·2679492	1·0352762	0
′	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	′
	77°			76°			75°			

Natural Sines, Tangents, Secants, &c.

′	15°			16°			17°			′
	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	
0	·2588190	0·2679492	1·0352762	·2756374	0·2867454	1·0402994	·2923717	0·3057307	1·0456918	60
1	·2591000	·2682610	1·0353569	·2759170	·2870602	1·0403863	·2926499	·3060488	1·0457848	59
2	·2593810	·2685728	1·0354378	·2761965	·2873751	1·0404732	·2929280	·3063670	1·0458780	58
3	·2596619	·2688847	1·0355187	·2764761	·2876900	1·0405602	·2932061	·3066852	1·0459712	57
4	·2599428	·2691967	1·0355998	·2767556	·2880050	1·0406473	·2934842	·3070034	1·0460646	56
5	·2602237	·2695087	1·0356809	·2770352	·2883201	1·0407346	·2937623	·3073218	1·0461581	55
6	·2605045	·2698207	1·0357621	·2773147	·2886352	1·0408219	·2940403	·3076402	1·0462516	54
7	·2607853	·2701328	1·0358435	·2775941	·2889503	1·0409094	·2943183	·3079586	1·0463453	53
8	·2610662	·2704449	1·0359249	·2778736	·2892655	1·0409969	·2945963	·3082771	1·0464391	52
9	·2613469	·2707571	1·0360065	·2781530	·2895808	1·0410845	·2948743	·3085957	1·0465330	51
10	·2616277	0·2710694	1·0360881	·2784324	0·2898961	1·0411723	·2951522	0·3089143	1·0466270	50
11	·2619085	·2713817	1·0361699	·2787118	·2902114	1·0412601	·2954302	·3092330	1·0467211	49
12	·2621892	·2716940	1·0362517	·2789911	·2905269	1·0413481	·2957081	·3095517	1·0468153	48
13	·2624699	·2720064	1·0363337	·2792704	·2908423	1·0414362	·2959859	·3098705	1·0469096	47
14	·2627506	·2723188	1·0364157	·2795497	·2911578	1·0415243	·2962638	·3101893	1·0470040	46
15	·2630312	·2726313	1·0364979	·2798290	·2914734	1·0416126	·2965416	·3105083	1·0470986	45
16	·2633118	·2729438	1·0365801	·2801083	·2917890	1·0417009	·2968194	·3108272	1·0471932	44
17	·2635925	·2732564	1·0366625	·2803875	·2921047	1·0417894	·2970971	·3111462	1·0472879	43
18	·2638730	·2735690	1·0367449	·2806667	·2924205	1·0418780	·2973749	·3114653	1·0473828	42
19	·2641536	·2738817	1·0368275	·2809459	·2927363	1·0419667	·2976526	·3117845	1·0474777	41
20	·2644342	0·2741945	1·0369101	·2812251	0·2930521	1·0420554	·2979303	0·3121036	1·0475728	40
21	·2647147	·2745072	1·0369929	·2815042	·2933680	1·0421443	·2982079	·3124229	1·0476679	39
22	·2649952	·2748201	1·0370757	·2817833	·2936839	1·0422333	·2984856	·3127422	1·0477632	38
23	·2652757	·2751330	1·0371587	·2820624	·2939999	1·0423224	·2987632	·3130616	1·0478586	37
24	·2655561	·2754459	1·0372417	·2823415	·2943160	1·0424116	·2990408	·3133810	1·0479540	36
25	·2658366	·2757589	1·0373249	·2826205	·2946321	1·0425009	·2993184	·3137005	1·0480496	35
26	·2661170	·2760719	1·0374082	·2828995	·2949483	1·0425903	·2995959	·3140200	1·0481453	34
27	·2663973	·2763850	1·0374915	·2831785	·2952645	1·0426798	·2998734	·3143396	1·0482411	33
28	·2666777	·2766981	1·0375750	·2834575	·2955808	1·0427694	·3001509	·3146593	1·0483370	32
29	·2669581	·2770113	1·0376585	·2837364	·2958971	1·0428591	·3004284	·3149790	1·0484330	31
30	·2672384	0·2773245	1·0377422	·2840153	0·2962135	1·0429489	·3007058	0·3152988	1·0485291	30
31	·2675187	·2776378	1·0378260	·2842942	·2965299	1·0430388	·3009832	·3156186	1·0486253	29
32	·2677989	·2779512	1·0379098	·2845731	·2968464	1·0431289	·3012606	·3159385	1·0487217	28
33	·2680792	·2782646	1·0379938	·2848520	·2971630	1·0432190	·3015380	·3162585	1·0488181	27
34	·2683594	·2785780	1·0380779	·2851308	·2974796	1·0433092	·3018153	·3165785	1·0489146	26
35	·2686396	·2788915	1·0381621	·2854096	·2977962	1·0433995	·3020926	·3168986	1·0490113	25
36	·2689198	·2792050	1·0382463	·2856884	·2981129	1·0434900	·3023699	·3172187	1·0491080	24
37	·2692000	·2795186	1·0383307	·2859671	·2984297	1·0435805	·3026471	·3175389	1·0492049	23
38	·2694801	·2798322	1·0384152	·2862458	·2987465	1·0436712	·3029244	·3178591	1·0493019	22
39	·2697602	·2801459	1·0384998	·2865246	·2990634	1·0437619	·3032016	·3181794	1·0493989	21
40	·2700403	0·2804597	1·0385844	·2868032	0·2993803	1·0438528	·3034788	0·3184998	1·0494961	20
41	·2703204	·2807735	1·0386692	·2870819	·2996973	1·0439437	·3037559	·3188202	1·0495934	19
42	·2706004	·2810873	1·0387541	·2873605	·3000144	1·0440348	·3040331	·3191407	1·0496908	18
43	·2708805	·2814012	1·0388391	·2876391	·3003315	1·0441259	·3043102	·3194613	1·0497883	17
44	·2711605	·2817152	1·0389242	·2879177	·3006486	1·0442172	·3045872	·3197819	1·0498859	16
45	·2714404	·2820292	1·0390094	·2881963	·3009658	1·0443086	·3048643	·3201025	1·0499836	15
46	·2717204	·2823432	1·0390947	·2884748	·3012831	1·0444001	·3051413	·3204232	1·0500815	14
47	·2720003	·2826573	1·0391800	·2887533	·3016004	1·0444917	·3054183	·3207440	1·0501794	13
48	·2722802	·2829715	1·0392655	·2890318	·3019178	1·0445833	·3056953	·3210649	1·0502774	12
49	·2725601	·2832857	1·0393511	·2893103	·3022352	1·0446751	·3059723	·3213858	1·0503756	11
50	·2728400	0·2835999	1·0394368	·2895887	0·3025527	1·0447670	·3062492	0·3217067	1·0504738	10
51	·2731198	·2839143	1·0395226	·2898671	·3028703	1·0448590	·3065261	·3220278	1·0505722	9
52	·2733997	·2842286	1·0396085	·2901455	·3031879	1·0449511	·3068030	·3223489	1·0506706	8
53	·2736794	·2845430	1·0396945	·2904239	·3035055	1·0450433	·3070798	·3226700	1·0507692	7
54	·2739592	·2848575	1·0397806	·2907022	·3038232	1·0451357	·3073566	·3229912	1·0508679	6
55	·2742390	·2851720	1·0398669	·2909805	·3041410	1·0452281	·3076334	·3233125	1·0509667	5
56	·2745187	·2854866	1·0399532	·2912588	·3044588	1·0453206	·3079102	·3236338	1·0510656	4
57	·2747984	·2858012	1·0400396	·2915371	·3047767	1·0454132	·3081869	·3239552	1·0511646	3
58	·2750781	·2861159	1·0401261	·2918153	·3050946	1·0455060	·3084636	·3242766	1·0512637	2
59	·2753577	·2864306	1·0402127	·2920935	·3054126	1·0455988	·3087403	·3245981	1·0513629	1
60	·2756374	0·2867454	1·0402994	·2923717	0·3057307	1·0456918	·3090170	0·3249197	1·0514622	0
′	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants	′
	74°			73°			72°			

Natural Sines, Tangents, Secants, &c.

′	18°			19°			20°			′
	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	
0	·3090170	0·3249197	1·0514622	·3255682	0·3443276	1·0576207	·3420201	0·3639702	1·0641778	60
1	·3092936	·3252413	1·0515617	·3258432	·3446530	1·0577267	·3422935	·3642997	1·0642905	59
2	·3095702	·3255630	1·0516612	·3261182	·3449785	1·0578328	·3425668	·3646292	1·0644033	58
3	·3098468	·3258848	1·0517608	·3263932	·3453040	1·0579390	·3428400	·3649588	1·0645163	57
4	·3101234	·3262066	1·0518606	·3266681	·3456296	1·0580453	·3431133	·3652885	1·0646294	56
5	·3103999	·3265284	1·0519605	·3269430	·3459553	1·0581517	·3433865	·3656182	1·0647425	55
6	·3106764	·3268504	1·0520604	·3272179	·3462810	1·0582583	·3436597	·3659480	1·0648558	54
7	·3109529	·3271724	1·0521605	·3274928	·3466068	1·0583649	·3439329	·3662779	1·0649693	53
8	·3112294	·3274944	1·0522607	·3277676	·3469327	1·0584717	·3442060	·3666079	1·0650828	52
9	·3115058	·3278165	1·0523610	·3280424	·3472586	1·0585786	·3444791	·3669379	1·0651964	51
10	·3117822	0·3281387	1·0524614	·3283172	0·3475846	1·0586855	·3447521	0·3672680	1·0653102	50
11	·3120586	·3284610	1·0525619	·3285919	·3479107	1·0587926	·3450252	·3675981	1·0654240	49
12	·3123349	·3287833	1·0526625	·3288666	·3482368	1·0588999	·3452982	·3679284	1·0655380	48
13	·3126112	·3291056	1·0527633	·3291413	·3485630	1·0590072	·3455712	·3682587	1·0656521	47
14	·3128875	·3294281	1·0528641	·3294160	·3488893	1·0591146	·3458441	·3685890	1·0657663	46
15	·3131638	·3297505	1·0529651	·3296906	·3492156	1·0592221	·3461171	·3689195	1·0658807	45
16	·3134400	·3300731	1·0530661	·3299653	·3495420	1·0593298	·3463900	·3692500	1·0659951	44
17	·3137163	·3303957	1·0531673	·3302398	·3498685	1·0594376	·3466628	·3695806	1·0661097	43
18	·3139925	·3307184	1·0532686	·3305144	·3501950	1·0595454	·3469357	·3699112	1·0662243	42
19	·3142686	·3310411	1·0533699	·3307889	·3505216	1·0596534	·3472085	·3702420	1·0663391	41
20	·3145448	0·3313639	1·0534714	·3310634	0·3508483	1·0597615	·3474812	0·3705728	1·0664540	40
21	·3148209	·3316868	1·0535730	·3313379	·3511750	1·0598697	·3477540	·3709036	1·0665690	39
22	·3150969	·3320097	1·0536747	·3316123	·3515018	1·0599781	·3480267	·3712346	1·0666842	38
23	·3153730	·3323327	1·0537765	·3318867	·3518287	1·0600865	·3482994	·3715656	1·0667994	37
24	·3156490	·3326557	1·0538785	·3321611	·3521556	1·0601951	·3485720	·3718967	1·0669148	36
25	·3159250	·3329788	1·0539805	·3324355	·3524826	1·0603037	·3488447	·3722278	1·0670302	35
26	·3162010	·3333020	1·0540826	·3327098	·3528096	1·0604125	·3491173	·3725590	1·0671458	34
27	·3164770	·3336252	1·0541849	·3329841	·3531368	1·0605214	·3493898	·3728903	1·0672615	33
28	·3167529	·3339485	1·0542873	·3332584	·3534640	1·0606304	·3496624	·3732217	1·0673774	32
29	·3170288	·3342719	1·0543897	·3335326	·3537912	1·0607395	·3499349	·3735532	1·0674933	31
30	·3173047	0·3345953	1·0544923	·3338069	0·3541186	1·0608487	·3502074	0·3738847	1·0676094	30
31	·3175805	·3349188	1·0545950	·3340810	·3544460	1·0609580	·3504798	·3742163	1·0677255	29
32	·3178563	·3352424	1·0546978	·3343552	·3547734	1·0610675	·3507523	·3745479	1·0678418	28
33	·3181321	·3355660	1·0548007	·3346293	·3551010	1·0611770	·3510247	·3748797	1·0679582	27
34	·3184079	·3358896	1·0549037	·3349034	·3554286	1·0612867	·3512970	·3752115	1·0680747	26
35	·3186836	·3362134	1·0550068	·3351775	·3557562	1·0613965	·3515693	·3755433	1·0681914	25
36	·3189593	·3365372	1·0551101	·3354516	·3560840	1·0615064	·3518416	·3758753	1·0683081	24
37	·3192350	·3368610	1·0552134	·3357256	·3564118	1·0616164	·3521139	·3762073	1·0684250	23
38	·3195106	·3371850	1·0553169	·3359996	·3567397	1·0617265	·3523862	·3765394	1·0685420	22
39	·3197863	·3375090	1·0554204	·3362735	·3570676	1·0618367	·3526584	·3768716	1·0686591	21
40	·3200619	0·3378330	1·0555241	·3365475	0·3573956	1·0619471	·3529306	0·3772038	1·0687763	20
41	·3203374	·3381571	1·0556279	·3368214	·3577237	1·0620575	·3532027	·3775361	1·0688936	19
42	·3206130	·3384813	1·0557318	·3370953	·3580518	1·0621681	·3534748	·3778685	1·0690110	18
43	·3208885	·3388056	1·0558358	·3373691	·3583801	1·0622788	·3537469	·3782010	1·0691286	17
44	·3211640	·3391299	1·0559399	·3376429	·3587083	1·0623896	·3540190	·3785335	1·0692463	16
45	·3214395	·3394543	1·0560441	·3379167	·3590367	1·0625005	·3542910	·3788661	1·0693641	15
46	·3217149	·3397787	1·0561485	·3381905	·3593651	1·0626115	·3545630	·3791988	1·0694820	14
47	·3219903	·3401032	1·0562529	·3384642	·3596936	1·0627227	·3548350	·3795315	1·0696000	13
48	·3222657	·3404278	1·0563575	·3387379	·3600222	1·0628339	·3551070	·3798644	1·0697182	12
49	·3225411	·3407524	1·0564621	·3390116	·3603508	1·0629453	·3553789	·3801973	1·0698364	11
50	·3228164	0·3410771	1·0565669	·3392852	0·3606795	1·0630568	·3556508	0·3805302	1·0699548	10
51	·3230917	·3414019	1·0566718	·3395589	·3610082	1·0631684	·3559226	·3808633	1·0700733	9
52	·3233670	·3417267	1·0567768	·3398325	·3613371	1·0632801	·3561944	·3811964	1·0701919	8
53	·3236422	·3420516	1·0568819	·3401060	·3616660	1·0633919	·3564662	·3815296	1·0703106	7
54	·3239174	·3423765	1·0569871	·3403796	·3619949	1·0635038	·3567380	·3818629	1·0704295	6
55	·3241926	·3427015	1·0570924	·3406531	·3623240	1·0636158	·3570097	·3821962	1·0705484	5
56	·3244678	·3430266	1·0571978	·3409265	·3626531	1·0637280	·3572814	·3825296	1·0706675	4
57	·3247429	·3433518	1·0573034	·3412000	·3629823	1·0638403	·3575531	·3828631	1·0707867	3
58	·3250180	·3436770	1·0574090	·3414734	·3633115	1·0639527	·3578248	·3831967	1·0709060	2
59	·3252931	·3440023	1·0575148	·3417468	·3636408	1·0640652	·3580964	·3835303	1·0710254	1
60	·3255682	0·3443276	1·0576207	·3420201	0·3639702	1·0641778	·3583679	0·3838640	1·0711450	0
′	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	′
	71°			70°			69°			

Natural Sines, Tangents, Secants, &c.

′	21°			22°			23°			′
	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	
0	·3583679	0·3838640	1·0711450	·3746066	0·4040262	1·0785347	·3907311	0·4244748	1·0863604	60
1	·3586395	·3841978	1·0712647	·3748763	·4043646	1·0786616	·3909989	·4248182	1·0864946	59
2	·3589110	·3845317	1·0713844	·3751459	·4047031	1·0787885	·3912666	·4251616	1·0866289	58
3	·3591825	·3848656	1·0715043	·3754156	·4050417	1·0789156	·3915343	·4255051	1·0867634	57
4	·3594540	·3851996	1·0716244	·3756852	·4053804	1·0790427	·3918019	·4258487	1·0868979	56
5	·3597254	·3855337	1·0717445	·3759547	·4057191	1·0791700	·3920695	·4261924	1·0870326	55
6	·3599968	·3858679	1·0718647	·3762243	·4060579	1·0792975	·3923371	·4265361	1·0871675	54
7	·3602682	·3862021	1·0719851	·3764938	·4063968	1·0794250	·3926047	·4268800	1·0873024	53
8	·3605395	·3865364	1·0721056	·3767632	·4067358	1·0795527	·3928722	·4272239	1·0874375	52
9	·3608108	·3868708	1·0722262	·3770327	·4070748	1·0796805	·3931397	·4275680	1·0875727	51
10	·3610821	0·3872053	1·0723469	·3773021	0·4074139	1·0798084	·3934071	0·4279121	1·0877080	50
11	·3613534	·3875398	1·0724678	·3775714	·4077531	1·0799364	·3936745	·4282563	1·0878435	49
12	·3616246	·3878744	1·0725887	·3778408	·4080924	1·0800646	·3939419	·4286005	1·0879791	48
13	·3618958	·3882091	1·0727098	·3781101	·4084318	1·0801928	·3942093	·4289449	1·0881148	47
14	·3621669	·3885439	1·0728310	·3783794	·4087713	1·0803212	·3944766	·4292894	1·0882506	46
15	·3624380	·3888787	1·0729523	·3786486	·4091108	1·0804497	·3947439	·4296339	1·0883866	45
16	·3627091	·3892136	1·0730737	·3789178	·4094504	1·0805784	·3950111	·4299785	1·0885226	44
17	·3629802	·3895486	1·0731953	·3791870	·4097901	1·0807071	·3952783	·4303232	1·0886589	43
18	·3632512	·3898837	1·0733170	·3794562	·4101299	1·0808360	·3955455	·4306680	1·0887952	42
19	·3635222	·3902189	1·0734388	·3797253	·4104697	1·0809650	·3958127	·4310129	1·0889317	41
20	·3637932	0·3905541	1·0735607	·3799944	0·4108097	1·0810942	·3960798	0·4313579	1·0890682	40
21	·3640641	·3908894	1·0736827	·3802634	·4111497	1·0812234	·3963468	·4317030	1·0892050	39
22	·3643351	·3912247	1·0738048	·3805324	·4114898	1·0813528	·3966139	·4320481	1·0893418	38
23	·3646059	·3915602	1·0739271	·3808014	·4118300	1·0814823	·3968809	·4323933	1·0894788	37
24	·3648768	·3918957	1·0740495	·3810704	·4121703	1·0816119	·3971479	·4327386	1·0896159	36
25	·3651476	·3922313	1·0741720	·3813393	·4125106	1·0817417	·3974148	·4330840	1·0897531	35
26	·3654184	·3925670	1·0742946	·3816082	·4128510	1·0818715	·3976818	·4334295	1·0898904	34
27	·3656891	·3929027	1·0744173	·3818770	·4131915	1·0820015	·3979486	·4337751	1·0900279	33
28	·3659599	·3932386	1·0745402	·3821459	·4135321	1·0821316	·3982155	·4341208	1·0901655	32
29	·3662306	·3935745	1·0746631	·3824147	·4138728	1·0822618	·3984823	·4344665	1·0903032	31
30	·3665012	0·3939105	1·0747862	·3826834	0·4142136	1·0823922	·3987491	0·4348124	1·0904411	30
31	·3667719	·3942465	1·0749095	·3829522	·4145544	1·0825227	·3990158	·4351583	1·0905791	29
32	·3670425	·3945827	1·0750328	·3832209	·4148953	1·0826533	·3992825	·4355043	1·0907172	28
33	·3673130	·3949189	1·0751562	·3834895	·4152363	1·0827840	·3995492	·4358504	1·0908554	27
34	·3675836	·3952552	1·0752798	·3837582	·4155774	1·0829149	·3998158	·4361966	1·0909938	26
35	·3678541	·3955916	1·0754035	·3840268	·4159186	1·0830458	·4000825	·4365429	1·0911323	25
36	·3681246	·3959280	1·0755273	·3842953	·4162598	1·0831769	·4003490	·4368893	1·0912709	24
37	·3683950	·3962645	1·0756512	·3845639	·4166012	1·0833081	·4006156	·4372357	1·0914097	23
38	·3686654	·3966011	1·0757753	·3848324	·4169426	1·0834395	·4008821	·4375823	1·0915485	22
39	·3689358	·3969378	1·0758995	·3851008	·4172841	1·0835709	·4011486	·4379289	1·0916876	21
40	·3692061	0·3972746	1·0760237	·3853693	0·4176257	1·0837025	·4014150	0·4382756	1·0918267	20
41	·3694765	·3976114	1·0761481	·3856377	·4179673	1·0838342	·4016814	·4386224	1·0919659	19
42	·3697468	·3979483	1·0762727	·3859060	·4183091	1·0839661	·4019478	·4389693	1·0921053	18
43	·3700170	·3982853	1·0763973	·3861744	·4186509	1·0840980	·4022141	·4393163	1·0922448	17
44	·3702872	·3986224	1·0765221	·3864427	·4189928	1·0842301	·4024804	·4396634	1·0923845	16
45	·3705574	·3989595	1·0766470	·3867110	·4193348	1·0843623	·4027467	·4400105	1·0925243	15
46	·3708276	·3992968	1·0767720	·3869792	·4196769	1·0844947	·4030129	·4403578	1·0926642	14
47	·3710977	·3996341	1·0768971	·3872474	·4200190	1·0846271	·4032791	·4407051	1·0928042	13
48	3713678	·3999715	1·0770224	·3875156	·4203613	1·0847597	·4035453	·4410526	1·0929444	12
49	·3716379	·4003089	1·0771477	·3877837	·4207036	1·0848924	·4038114	·4414001	1·0930846	11
50	·3719079	0·4006465	1·0772732	·3880518	0·4210460	1·0850252	·4040775	0·4417477	1·0932251	10
51	·3721780	·4009841	1·0773988	·3883199	·4213885	1·0851582	·4043436	·4420954	1·0933656	9
52	·3724479	·4013218	1·0775246	·3885880	·4217311	1·0852913	·4046096	·4424432	1·0935063	8
53	·3727179	·4016596	1·0776504	·3888560	·4220738	1·0854245	·4048756	·4427910	1·0936471	7
54	·3729878	·4019974	1·0777764	·3891240	·4224165	1·0855578	·4051416	·4431390	1·0937880	6
55	·3732577	·4023354	1·0779025	·3893919	·4227594	1·0856912	·4054075	·4434871	1·0939291	5
56	·3735275	·4026734	1·0780287	·3896598	·4231023	1·0858248	·4056734	·4438352	1·0940702	4
57	·3737973	·4030115	1·0781550	·3899277	·4234453	1·0859585	·4059393	·4441834	1·0942116	3
58	·3740671	·4033496	1·0782815	·3901955	·4237884	1·0860924	·4062051	·4445318	1·0943530	2
59	·3743369	·4036879	1·0784080	·3904633	·4241316	1·0862263	·4064709	·4448802	1·0944946	1
60	·3746066	0·4040262	1·0785347	·3907311	0·4244748	1·0863604	·4067366	0·4452287	1·0946363	0
′	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	′
	68°			67°			66°			

Natural Sines, Tangents, Secants, &c.

′	24°			25°			26°			′
	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	
0	·4067366	0·4452287	1·0946363	·4226183	0·4663077	1·1033779	·4383711	0·4877326	1·1126019	60
1	·4070024	·4455773	1·0947781	·4228819	·4666618	1·1035277	·4386326	·4880927	1·1127599	59
2	·4072681	·4459260	1·0949201	·4231455	·4670161	1·1036775	·4388940	·4884530	1·1129179	58
3	·4075337	·4462747	1·0950622	·4234090	·4673705	1·1038275	·4391553	·4888133	1·1130761	57
4	·4077993	·4466236	1·0952044	·4236725	·4677250	1·1039777	·4394166	·4891737	1·1132345	56
5	·4080649	·4469726	1·0953467	·4239360	·4680796	1·1041279	·4396779	·4895343	1·1133929	55
6	·4083305	·4473216	1·0954892	·4241994	·4684342	1·1042783	·4399392	·4898949	1·1135516	54
7	·4085960	·4476708	1·0956318	·4244628	·4687890	1·1044289	·4402004	·4902557	1·1137103	53
8	·4088615	·4480200	1·0957746	·4247262	·4691439	1·1045795	·4404615	·4906166	1·1138692	52
9	·4091269	·4483693	1·0959174	·4249895	·4694988	1·1047303	·4407227	·4909775	1·1140282	51
10	·4093923	0·4487187	1·0960604	·4252528	0·4698539	1·1048813	·4409838	0·4913386	1·1141874	50
11	·4096577	·4490682	1·0962036	·4255161	·4702090	1·1050324	·4412448	·4916997	1·1143467	49
12	·4099230	·4494178	1·0963468	·4257793	·4705643	1·1051836	·4415059	·4920610	1·1145062	48
13	·4101883	·4497675	1·0964902	·4260425	·4709196	1·1053349	·4417668	·4924224	1·1146658	47
14	·4104536	·4501173	1·0966337	·4263056	·4712751	1·1054864	·4420278	·4927838	1·1148255	46
15	·4107189	·4504672	1·0967774	·4265687	·4716306	1·1056380	·4422887	·4931454	1·1149854	45
16	·4109841	·4508171	1·0969212	·4268318	·4719863	1·1057898	·4425496	·4935071	1·1151454	44
17	·4112492	·4511672	1·0970651	·4270949	·4723420	1·1059417	·4428104	·4938689	1·1153056	43
18	·4115144	·4515173	1·0972091	·4273579	·4726978	1·1060937	·4430712	·4942308	1·1154659	42
19	·4117795	·4518676	1·0973533	·4276208	·4730538	1·1062458	·4433319	·4945928	1·1156263	41
20	·4120445	0·4522179	1·0974976	·4278838	0·4734098	1·1063981	·4435927	0·4949549	1·1157869	40
21	·4123096	·4525683	1·0976420	·4281467	·4737659	1·1065506	·4438534	·4953171	1·1159476	39
22	·4125745	·4529188	1·0977866	·4284095	·4741222	1·1067031	·4441140	·4956794	1·1161084	38
23	·4128395	·4532694	1·0979313	·4286723	·4744785	1·1068558	·4443746	·4960418	1·1162694	37
24	·4131044	·4536201	1·0980761	·4289351	·4748349	1·1070087	·4446352	·4964043	1·1164306	36
25	·4133693	·4539709	1·0982211	·4291979	·4751914	1·1071616	·4448957	·4967669	1·1165919	35
26	·4136342	·4543218	1·0983662	·4294606	·4755481	1·1073147	·4451562	·4971297	1·1167533	34
27	·4138990	·4546728	1·0985114	·4297233	·4759048	1·1074680	·4454167	·4974925	1·1169148	33
28	·4141638	·4550238	1·0986568	·4299859	·4762616	1·1076214	·4456771	·4978554	1·1170766	32
29	·4144285	·4553750	1·0988023	·4302485	·4766185	1·1077749	·4459375	·4982185	1·1172384	31
30	·4146932	0·4557263	1·0989479	·4305111	0·4769755	1·1079285	·4461978	0·4985816	1·1174004	30
31	·4149579	·4560776	1·0990936	·4307736	·4773326	1·1080823	·4464581	·4989449	1·1175625	29
32	·4152226	·4564290	1·0992395	·4310361	·4776899	1·1082363	·4467184	·4993082	1·1177248	28
33	·4154872	·4567806	1·0993855	·4312986	·4780472	1·1083903	·4469786	·4996717	1·1178872	27
34	·4157517	·4571322	1·0995317	·4315610	·4784046	1·1085445	·4472388	·5000352	1·1180498	26
35	·4160163	·4574839	1·0996779	·4318234	·4787621	1·1086989	·4474990	·5003989	1·1182124	25
36	·4162808	·4578357	1·0998243	·4320857	·4791197	1·1088533	·4477591	·5007627	1·1183753	24
37	·4165453	·4581877	1·0999709	·4323481	·4794774	1·1090079	·4480192	·5011266	1·1185383	23
38	·4168097	·4585397	1·1001175	·4326103	·4798352	1·1091627	·4482792	·5014906	1·1187014	22
39	·4170741	·4588918	1·1002644	·4328726	·4801932	1·1093176	·4485392	·5018547	1·1188647	21
40	·4173385	0·4592439	1·1004113	·4331348	0·4805512	1·1094726	·4487992	0·5022189	1·1190281	20
41	·4176028	·4595962	1·1005584	·4333970	·4809093	1·1096277	·4490591	·5025832	1·1191916	19
42	·4178671	·4599486	1·1007056	·4336591	·4812675	1·1097830	·4493190	·5029476	1·1193553	18
43	·4181313	·4603011	1·1008529	·4339212	·4816258	1·1099385	·4495789	·5033121	1·1195191	17
44	·4183956	·4606537	1·1010004	·4341832	·4819842	1·1100940	·4498387	·5036768	1·1196831	16
45	·4186597	·4610063	1·1011480	·4344453	·4823427	1·1102498	·4500984	·5040415	1·1198472	15
46	·4189239	·4613591	1·1012957	·4347072	·4827014	1·1104056	·4503582	·5044063	1·1200115	14
47	·4191880	·4617119	1·1014436	·4349692	·4830601	1·1105616	·4506179	·5047713	1·1201759	13
48	·4194521	·4620649	1·1015916	·4352311	·4834189	1·1107177	·4508775	·5051363	1·1203405	12
49	·4197161	·4624179	1·1017397	·4354930	·4837778	1·1108740	·4511372	·5055015	1·1205051	11
50	·4199801	0·4627710	1·1018879	·4357548	0·4841368	1·1110304	·4513967	0·5058668	1·1206700	10
51	·4202441	·4631243	1·1020363	·4360166	·4844959	1·1111869	·4516563	·5062322	1·1208350	9
52	·4205080	·4634776	1·1021849	·4362784	·4848552	1·1113436	·4519158	·5065977	1·1210001	8
53	·4207719	·4638310	1·1023335	·4365401	·4852145	1·1115004	·4521753	·5069633	1·1211653	7
54	·4210358	·4641845	1·1024823	·4368018	·4855739	1·1116573	·4524347	·5073290	1·1213308	6
55	·4212996	·4645382	1·1026313	·4370634	·4859334	1·1118144	·4526941	·5076948	1·1214963	5
56	·4215634	·4648919	1·1027803	·4373251	·4862931	1·1119716	·4529535	·5080607	1·1216620	4
57	·4218272	·4652457	1·1029295	·4375866	·4866528	1·1121290	·4532128	·5084267	1·1218278	3
58	·4220909	·4655996	1·1030789	·4378482	·4870126	1·1122865	·4534721	·5087929	1·1219938	2
59	·4223546	·4659536	1·1032283	·4381097	·4873726	1·1124442	·4537313	·5091591	1·1221600	1
60	·4226183	0·4663077	1·1033779	·4383711	0·4877326	1·1126019	·4539905	0·5095254	1·1223262	0
′	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	′
	65°			64°			63°			

Natural Sines, Tangents, Secants, &c.

′	27°			28°			29°			′
	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	
0	·4539905	0·5095254	1·1223262	·4694716	0·5317094	1·1325701	·4848096	0·5543091	1·1433541	60
1	·4542497	·5098919	1·1224927	·4697284	·5320826	1·1327453	·4850640	·5546894	1·1435385	59
2	·4545088	·5102585	1·1226592	·4699852	·5324559	1·1329207	·4853184	·5550698	1·1437231	58
3	·4547679	·5106252	1·1228259	·4702419	·5328293	1·1330962	·4855727	·5554504	1·1439078	57
4	·4550269	·5109919	1·1229928	·4704986	·5332029	1·1332719	·4858270	·5558311	1·1440927	56
5	·4552859	·5113588	1·1231598	·4707553	·5335765	1·1334478	·4860812	·5562119	1·1442778	55
6	·4555449	·5117259	1·1233269	·4710119	·5339503	1·1336238	·4863354	·5565929	1·1444630	54
7	·4558038	·5120930	1·1234942	·4712685	·5343242	1·1337999	·4865895	·5569739	1·1446484	53
8	·4560627	·5124602	1·1236616	·4715250	·5346981	1·1339762	·4868436	·5573551	1·1448339	52
9	·4563216	·5128275	1·1238292	·4717815	·5350723	1·1341527	·4870977	·5577364	1·1450196	51
10	·4565804	0·5131950	1·1239969	·4720380	0·5354465	1·1343293	·4873517	0·5581179	1·1452055	50
11	·4568392	·5135625	1·1241648	·4722944	·5358208	1·1345060	·4876057	·5584994	1·1453915	49
12	·4570979	·5139302	1·1243328	·4725508	·5361953	1·1346829	·4878597	·5588811	1·1455776	48
13	·4573566	·5142980	1·1245010	·4728071	·5365699	1·1348600	·4881136	·5592629	1·1457639	47
14	·4576153	·5146658	1·1246693	·4730634	·5369446	1·1350372	·4883674	·5596449	1·1459504	46
15	·4578739	·5150338	1·1248377	·4733197	·5373194	1·1352146	·4886212	·5600269	1·1461371	45
16	·4581325	·5154019	1·1250063	·4735759	·5376943	1·1353921	·4888750	·5604091	1·1463238	44
17	·4583910	·5157702	1·1251750	·4738321	·5380694	1·1355697	·4891288	·5607914	1·1465108	43
18	·4586496	·5161385	1·1253439	·4740882	·5384445	1·1357497	·4893825	·5611738	1·1466979	42
19	·4589080	·5165069	1·1255130	·4743443	·5388198	1·1359255	·4896361	·5615564	1·1468852	41
20	·4591665	0·5168755	1·1256821	·4746004	0·5391952	1·1361036	·4898897	0·5619391	1·1470726	40
21	·4594248	·5172441	1·1258514	·4748564	·5395707	1·1362819	·4901433	·5623219	1·1472602	39
22	·4596832	·5176129	1·1260209	·4751124	·5399464	1·1364603	·4903968	·5627048	1·1474479	38
23	·4599415	·5179818	1·1261905	·4753683	·5403221	1·1366389	·4906503	·5630879	1·1476358	37
24	·4601998	·5183508	1·1263603	·4756242	·5406980	1·1368176	·4909038	·5634710	1·1478239	36
25	·4604580	·5187199	1·1265302	·4758801	·5410740	1·1369965	·4911572	·5638543	1·1480121	35
26	·4607162	·5190891	1·1267003	·4761359	·5414501	1·1371755	·4914105	·5642378	1·1482005	34
27	·4609744	·5194584	1·1268705	·4763917	·5418263	1·1373547	·4916638	·5646213	1·1483890	33
28	·4612325	·5198278	1·1270408	·4766474	·5422027	1·1375341	·4919171	·5650050	1·1485777	32
29	·4614906	·5201974	1·1272113	·4769031	·5425791	1·1377135	·4921704	·5653888	1·1487665	31
30	·4617486	0·5205671	1·1273819	·4771588	0·5429557	1·1378932	·4924236	0·5657728	1·1489555	30
31	·4620066	·5209368	1·1275527	·4774144	·5433324	1·1380730	·4926767	·5661568	1·1491447	29
32	·4622646	·5213067	1·1277237	·4776700	·5437092	1·1382529	·4929298	·5665410	1·1493340	28
33	·4625225	·5216767	1·1278948	·4779255	·5440862	1·1384330	·4931829	·5669254	1·1495235	27
34	·4627804	·5220468	1·1280660	·4781810	·5444632	1·1386133	·4934359	·5673098	1·1497132	26
35	·4630382	·5224170	1·1282374	·4784364	·5448404	1·1387937	·4936889	·5676944	1·1499030	25
36	·4632960	·5227874	1·1284089	·4786919	·5452177	1·1389742	·4939419	·5680791	1·1500930	24
37	·4635538	·5231578	1·1285806	·4789472	·5455951	1·1391550	·4941948	·5684639	1·1502831	23
38	·4638115	·5235284	1·1287524	·4792026	·5459727	1·1393358	·4944476	·5688488	1·1504734	22
39	·4640692	·5238990	1·1289244	·4794579	·5463503	1·1395169	·4947005	·5692339	1·1506638	21
40	·4643269	0·5242698	1·1290965	·4797131	0·5467281	1·1396980	·4949532	0·5696191	1·1508544	20
41	·4645845	·5246407	1·1292687	·4799683	·5471060	1·1398794	·4952060	·5700045	1·1510452	19
42	·4648420	·5250117	1·1294412	·4802235	·5474840	1·1400608	·4954587	·5703899	1·1512361	18
43	·4650996	·5253829	1·1296137	·4804786	·5478621	1·1402425	·4957113	·5707755	1·1514272	17
44	·4653571	·5257541	1·1297864	·4807337	·5482404	1·1404243	·4959639	·5711612	1·1516185	16
45	·4656145	·5261255	1·1299593	·4809888	·5486188	1·1406062	·4962165	·5715471	1·1518099	15
46	·4658719	·5264969	1·1301323	·4812438	·5489973	1·1407883	·4964690	·5719331	1·1520015	14
47	·4661293	·5268685	1·1303055	·4814987	·5493759	1·1409706	·4967215	·5723192	1·1521932	13
48	·4663866	·5272402	1·1304788	·4817537	·5497547	1·1411530	·4969740	·5727054	1·1523851	12
49	·4666439	·5276120	1·1306522	·4820086	·5501335	1·1413356	·4972264	·5730918	1·1525772	11
50	·4669012	0·5279839	1·1308258	·4822634	·5505125	1·1415183	·4974787	0·5734783	1·1527694	10
51	·4671584	·5283560	1·1309996	·4825182	·5508916	1·1417012	·4977310	·5738649	1·1529618	9
52	·4674156	·5287281	1·1311735	·4827730	·5512708	1·1418842	·4979833	·5742516	1·1531543	8
53	·4676727	·5291004	1·1313475	·4830277	·5516502	1·1420674	·4982355	·5746385	1·1533470	7
54	·4679298	·5294727	1·1315217	·4832824	·5520297	1·1422507	·4984877	·5750255	1·1535399	6
55	·4681869	·5298452	1·1316961	·4835370	·5524093	1·1424342	·4987399	·5754126	1·1537329	5
56	·4684439	·5302178	1·1318706	·4837916	·5527890	1·1426179	·4989920	·5757999	1·1539261	4
57	·4687009	·5305906	1·1320452	·4840462	·5531688	1·1428017	·4992441	·5761873	1·1541195	3
58	·4689578	·5309634	1·1322200	·4843007	·5535488	1·1429857	·4994961	·5765748	1·1543130	2
59	·4692147	·5313364	1·1323950	·4845552	·5539288	1·1431698	·4997481	·5769625	1·1545067	1
60	·4694716	0·5317094	1·1325701	·4848096	0·5543091	1·1433541	·5000000	0·5773503	1·1547005	0
′	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	′
	62°			61°			60°			

Natural Sines, Tangents, Secants, &c.

′	30°			31°			32°			′
	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	
0	·5000000	0·5773503	1·1547005	·5150381	0·6008606	1·1666334	·5299193	0·6248694	1·1791784	60
1	·5002519	·5777382	1·1548945	·5152874	·6012566	1·1668374	·5301659	·6252739	1·1793928	59
2	·5005037	·5781262	1·1550887	·5155367	·6016527	1·1670416	·5304125	·6256786	1·1796074	58
3	·5007556	·5785144	1·1552830	·5157859	·6020490	1·1672459	·5306591	·6260834	1·1798222	57
4	·5010073	·5789027	1·1554775	·5160351	·6024454	1·1674504	·5309057	·6264884	1·1800372	56
5	·5012591	·5792912	1·1556722	·5162842	·6028419	1·1676551	·5311521	·6268935	1·1802523	55
6	·5015107	·5796797	1·1558670	·5165333	·6032386	1·1678599	·5313986	·6272988	1·1804676	54
7	·5017624	·5800684	1·1560620	·5167824	·6036354	1·1680649	·5316450	·6277042	1·1806831	53
8	·5020140	·5804573	1·1562572	·5170314	·6040323	1·1682701	·5318913	·6281098	1·1808988	52
9	·5022655	·5808462	1·1564525	·5172804	·6044294	1·1684755	·5321376	·6285155	1·1811146	51
10	·5025170	0·5812353	1·1566480	·5175293	0·6048266	1·1686810	·5323839	0·6289214	1·1813307	50
11	·5027685	·5816245	1·1568436	·5177782	·6052240	1·1688867	·5326301	·6293274	1·1815469	49
12	·5030199	·5820139	1·1570394	·5180270	·6056215	1·1690926	·5328763	·6297336	1·1817633	48
13	·5032713	·5824034	1·1572354	·5182758	·6060192	1·1692986	·5331224	·6301399	1·1819798	47
14	·5035227	·5827930	1·1574315	·5185246	·6064170	1·1695048	·5333685	·6305464	1·1821966	46
15	·5037740	·5831828	1·1576278	·5187733	·6068149	1·1697112	·5336145	·6309530	1·1824135	45
16	·5040252	·5835726	1·1578243	·5190219	·6072130	1·1699178	·5338605	·6313598	1·1826306	44
17	·5042765	·5839627	1·1580209	·5192705	·6076112	1·1701245	·5341065	·6317667	1·1828479	43
18	·5045276	·5843528	1·1582177	·5195191	·6080095	1·1703314	·5343523	·6321738	1·1830654	42
19	·5047788	·5847431	1·1584146	·5197676	·6084080	1·1705385	·5345982	·6325810	1·1832830	41
20	·5050298	0·5851335	1·1586118	·5200161	0·6088067	1·1707457	·5348440	0·6329883	1·1835008	40
21	·5052809	·5855241	1·1588091	·5202646	·6092054	1·1709531	·5350898	·6333959	1·1837188	39
22	·5055319	·5859148	1·1590065	·5205130	·6096043	1·1711607	·5353355	·6338035	1·1839370	38
23	·5057828	·5863056	1·1592041	·5207613	·6100034	1·1713685	·5355812	·6342113	1·1841554	37
24	·5060338	·5866965	1·1594019	·5210096	·6104026	1·1715764	·5358268	·6346193	1·1843739	36
25	·5062846	·5870876	1·1595999	·5212579	·6108019	1·1717845	·5360724	·6350274	1·1845927	35
26	·5065355	·5874788	1·1597980	·5215061	·6112014	1·1719928	·5363179	·6354357	1·1848116	34
27	·5067863	·5878702	1·1599963	·5217543	·6116011	1·1722013	·5365634	·6358441	1·1850307	33
28	·5070370	·5882616	1·1601947	·5220024	·6120008	1·1724099	·5368089	·6362527	1·1852500	32
29	·5072877	·5886533	1·1603933	·5222505	·6124007	1·1726187	·5370543	·6366614	1·1854694	31
30	·5075384	0·5890450	1·1605921	·5224986	0·6128008	1·1728277	·5372996	0·6370703	1·1856890	30
31	·5077890	·5894369	1·1607911	·5227466	·6132010	1·1730368	·5375449	·6374793	1·1859089	29
32	·5080396	·5898289	1·1609902	·5229945	·6136013	1·1732462	·5377902	·6378885	1·1861289	28
33	·5082901	·5902211	1·1611894	·5232424	·6140018	1·1734557	·5380354	·6382978	1·1863490	27
34	·5085406	·5906134	1·1613889	·5234903	·6144024	1·1736653	·5382806	·6387073	1·1865694	26
35	·5087910	·5910058	1·1615885	·5237381	·6148032	1·1738752	·5385257	·6391169	1·1867900	25
36	·5090414	·5913984	1·1617883	·5239859	·6152041	1·1740852	·5387708	·6395267	1·1870107	24
37	·5092918	·5917910	1·1619882	·5242336	·6156052	1·1742954	·5390158	·6399366	1·1872316	23
38	·5095421	·5921839	1·1621883	·5244813	·6160064	1·1745058	·5392608	·6403467	1·1874527	22
39	·5097924	·5925768	1·1623886	·5247290	·6164077	1·1747163	·5395058	·6407569	1·1876740	21
40	·5100426	0·5929699	1·1625891	·5249766	0·6168092	1·1749270	·5397507	0·6411673	1·1878954	20
41	·5102928	·5933632	1·1627897	·5252241	·6172108	1·1751379	·5399955	·6415779	1·1881171	19
42	·5105429	·5937565	1·1629905	·5254717	·6176126	1·1753490	·5402403	·6419886	1·1883389	18
43	·5107930	·5941501	1·1631914	·5257191	·6180145	1·1755603	·5404851	·6423994	1·1885609	17
44	·5110431	·5945437	1·1633925	·5259665	·6184166	1·1757717	·5407298	·6428105	1·1887831	16
45	·5112931	·5949375	1·1635938	·5262139	·6188188	1·1759833	·5409745	·6432216	1·1890055	15
46	·5115431	·5953314	1·1637953	·5264613	·6192211	1·1761951	·5412191	·6436329	1·1892280	14
47	·5117930	·5957255	1·1639969	·5267085	·6196236	1·1764070	·5414637	·6440444	1·1894508	13
48	·5120429	·5961196	1·1641987	·5269558	·6200263	1·1766191	·5417082	·6444560	1·1896737	12
49	·5122927	·5965140	1·1644007	·5272030	·6204291	1·1768314	·5419527	·6448678	1·1898968	11
50	·5125425	0·5969084	1·1646028	·5274502	0·6208320	1·1770439	·5421971	0·6452797	1·1901201	10
51	·5127923	·5973030	1·1648051	·5276973	·6212351	1·1772566	·5424415	·6456918	1·1903436	9
52	·5130420	·5976978	1·1650076	·5279443	·6216383	1·1774694	·5426859	·6461041	1·1905673	8
53	·5132916	·5980926	1·1652102	·5281914	·6220417	1·1776824	·5429302	·6465165	1·1907911	7
54	·5135413	·5984877	1·1654130	·5284383	·6224452	1·1778956	·5431744	·6469290	1·1910152	6
55	·5137908	·5988828	1·1656160	·5286853	·6228488	1·1781089	·5434187	·6473417	1·1912394	5
56	·5140404	·5992781	1·1658191	·5289322	·6232527	1·1783225	·5436628	·6477546	1·1914638	4
57	·5142899	·5996735	1·1660224	·5291790	·6236566	1·1785362	·5439069	·6481676	1·1916884	3
58	·5145393	·6000691	1·1662259	·5294258	·6240607	1·1787501	·5441510	·6485808	1·1919132	2
59	·5147887	·6004648	1·1664296	·5296726	·6244650	1·1789642	·5443951	·6489941	1·1921381	1
60	·5150381	0·6008606	1·1666334	·5299193	0·6248694	1·1791784	·5446390	0·6494076	1·1923633	0
′	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	′
	59°			58°			57°			

Natural Sines, Tangents, Secants, &c.

′	33°			34°			35°			′
	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	
0	·5446390	0·6494076	1·1923633	·5591929	0·6745085	1·2062179	·5735764	0·7002075	1·2207746	60
1	·5448830	·6498212	1·1925886	·5594340	·6749318	1·2064547	·5738147	·7006411	1·2210233	59
2	·5451269	·6502350	1·1928142	·5596751	·6753553	1·2066917	·5740529	·7010749	1·2212723	58
3	·5453707	·6506490	1·1930399	·5599162	·6757790	1·2069288	·5742911	·7015089	1·2215215	57
4	·5456145	·6510631	1·1932658	·5601572	·6762028	1·2071662	·5745292	·7019430	1·2217708	56
5	·5458583	·6514774	1·1934918	·5603981	·6766268	1·2074037	·5747672	·7023773	1·2220204	55
6	·5461020	·6518918	1·1937181	·5606390	·6770509	1·2076415	·5750053	·7028118	1·2222702	54
7	·5463456	·6523064	1·1939446	·5608798	·6774752	1·2078794	·5752432	·7032464	1·2225202	53
8	·5465892	·6527211	1·1941712	·5611206	·6778997	1·2081175	·5754811	·7036813	1·2227703	52
9	·5468328	·6531360	1·1943980	·5613614	·6783243	1·2083559	·5757190	·7041163	1·2230207	51
10	·5470763	0·6535511	1·1946251	·5616021	0·6787492	1·2085944	·5759568	0·7045515	1·2232713	50
11	·5473198	·6539663	1·1948523	·5618428	·6791741	1·2088331	·5761946	·7049869	1·2235222	49
12	·5475632	·6543817	1·1950796	·5620834	·6795993	1·2090720	·5764323	·7054224	1·2237732	48
13	·5478066	·6547972	1·1953072	·5623239	·6800246	1·2093112	·5766700	·7058581	1·2240244	47
14	·5480499	·6552129	1·1955350	·5625645	·6804501	1·2095505	·5769076	·7062940	1·2242758	46
15	·5482932	·6556287	1·1957629	·5628049	·6808758	1·2097900	·5771452	·7067301	1·2245274	45
16	·5485365	·6560447	1·1959911	·5630453	·6813016	1·2100297	·5773827	·7071664	1·2247793	44
17	·5487797	·6564609	1·1962194	·5632857	·6817276	1·2102696	·5776202	·7076028	1·2250313	43
18	·5490228	·6568772	1·1964479	·5635260	·6821537	1·2105097	·5778576	·7080395	1·2252836	42
19	·5492659	·6572937	1·1966767	·5637663	·6825801	1·2107500	·5780950	·7084763	1·2255361	41
20	·5495090	0·6577103	1·1969056	·5640066	0·6830066	1·2109905	·5783323	0·7089133	1·2257887	40
21	·5497520	·6581271	1·1971346	·5642467	·6834333	1·2112312	·5785696	·7093504	1·2260416	39
22	·5499950	·6585441	1·1973639	·5644869	·6838601	1·2114721	·5788069	·7097878	1·2262947	38
23	·5502379	·6589612	1·1975934	·5647270	·6842871	1·2117132	·5790440	·7102253	1·2265480	37
24	·5504807	·6593785	1·1978230	·5649670	·6847143	1·2119545	·5792812	·7106630	1·2268015	36
25	·5507236	·6597960	1·1980529	·5652070	·6851416	1·2121960	·5795183	·7111009	1·2270552	35
26	·5509663	·6602136	1·1982829	·5654469	·6855692	1·2124377	·5797553	·7115390	1·2273091	34
27	·5512091	·6606313	1·1985131	·5656868	·6859969	1·2126795	·5799923	·7119772	1·2275633	33
28	·5514518	·6610492	1·1987435	·5659267	·6864247	1·2129216	·5802292	·7124157	1·2278176	32
29	·5516944	·6614673	1·1989741	·5661665	·6868528	1·2131639	·5804661	·7128543	1·2280722	31
30	·5519370	0·6618856	1·1992049	·5664062	0·6872810	1·2134064	·5807030	0·7132931	1·2283269	30
31	·5521795	·6623040	1·1994359	·5666459	·6877093	1·2136491	·5809397	·7137320	1·2285819	29
32	·5524220	·6627225	1.1996671	·5668856	·6881379	1·2138920	·5811765	·7141712	1·2288371	28
33	·5526645	·6631413	1·1998985	·5671252	·6885666	1·2141351	·5814132	·7146106	1·2290924	27
34	·5529069	·6635601	1·2001300	·5673648	·6889955	1·2143784	·5816498	·7150501	1·2293480	26
35	·5531492	·6639792	1·2003618	·5676043	·6894246	1·2146218	·5818864	·7154898	1·2296039	25
36	·5533915	·6643984	1·2005937	·5678437	·6898538	1·2148655	·5821230	·7159297	1·2298599	24
37	·5536338	·6648178	1·2008258	·5680832	·6902832	1·2151094	·5823595	·7163698	1·2301161	23
38	·5538760	·6652373	1·2010582	·5683225	·6907128	1·2153535	·5825959	·7168100	1·2303725	22
39	·5541182	·6656570	1·2012907	·5685619	·6911425	1·2155978	·5828323	·7172505	1·2306292	21
40	·5543603	0·6660769	1·2015234	·5688011	0·6915725	1·2158423	·5830687	0·7176911	1·2308861	20
41	·5546024	·6664969	1·2017563	·5690403	·6920026	1·2160870	·5833050	·7181319	1·2311432	19
42	·5548444	·6669171	1·2019894	·5692795	·6924328	1·2163319	·5835412	·7185729	1·2314004	18
43	·5550864	·6673374	1·2022226	·5695187	·6928633	1·2165770	·5837774	·7190141	1·2316579	17
44	·5553283	·6677580	1·2024561	·5697577	·6932939	1·2168223	·5840136	·7194554	1·2319156	16
45	·5555702	·6681786	1·2026898	·5699968	·6937247	1·2170678	·5842497	·7198970	1·2321736	15
46	·5558121	·6685995	1·2029236	·5702357	·6941557	1·2173135	·5844857	·7203387	1·2324317	14
47	·5560539	·6690205	1·2031577	·5704747	·6945868	1·2175594	·5847217	·7207806	1·2326900	13
48	·5562956	·6694417	1·2033919	·5707136	·6950181	1·2178055	·5849577	·7212227	1·2329486	12
49	·5565373	·6698630	1·2036264	·5709524	·6954496	1·2180518	·5851936	·7216650	1·2332074	11
50	·5567790	0·6702845	1·2038610	·5711912	0·6958813	1·2182983	·5854294	0·7221075	1·2334664	10
51	·5570206	·6707061	1·2040958	·5714299	·6963131	1·2185450	·5856652	·7225502	1·2337256	9
52	·5572621	·6711280	1·2043308	·5716686	·6967451	1 2187919	·5859010	·7229930	1·2339850	8
53	·5575036	·6715500	1·2045660	·5719073	·6971773	1·2190390	·5861367	·7234361	1·2342446	7
54	·5577451	·6719721	1·2048014	·5721459	·6976097	1·2192864	·5863724	·7238793	1·2345044	6
55	·5579865	·6723944	1·2050370	·5723844	·6980422	1·2195339	·5866080	·7243227	1·2347645	5
56	·5582279	·6728169	1·2052728	·5726229	·6984749	1·2197816	·5868435	·7247663	1·2350248	4
57	·5584692	·6732396	1·2055088	·5728614	·6989078	1·2200296	·5870790	·7252101	1·2352852	3
58	·5587105	·6736624	1·2057450	·5730998	·6993409	1·2202777	·5873145	·7256540	1·2355459	2
59	·5589517	·6740854	1·2059814	·5733381	·6997741	1·2205260	·5875499	·7260982	1·2358069	1
60	·5591929	0·6745085	1·2062179	·5735764	0·7002075	1·2207746	·5877853	0·7265425	1·2360680	0
′	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	′
	56°			55°			54°			

Natural Sines, Tangents, Secants, &c.

′	36°			37°			38°			′
	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	
0	·5877853	0·7265425	1·2360680	·6018150	0·7535541	1·2521357	·6156615	0·7812856	1·2690182	60
1	·5880206	·7269871	1·2363293	·6020473	·7540102	1·2524102	·6158907	·7817542	1·2693067	59
2	·5882558	·7274318	1·2365909	·6022795	·7544666	1·2526850	·6161198	·7822229	1·2695955	58
3	·5884910	·7278767	1·2368526	·6025117	·7549232	1·2529601	·6163489	·7826919	1·2698845	57
4	·5887262	·7283218	1·2371146	·6027439	·7553799	1·2532353	·6165780	·7831611	1·2701737	56
5	·5889613	·7287671	1·2373768	·6029760	·7558369	1·2535108	·6168069	·7836305	1·2704632	55
6	·5891964	·7292125	1·2376393	·6032080	·7562941	1·2537865	·6170359	·7841002	1·2707529	54
7	·5894314	·7296582	1·2379019	·6034400	·7567514	1·2540625	·6172648	·7845700	1·2710429	53
8	·5896663	·7301041	1·2381647	·6036719	·7572090	1·2543387	·6174936	·7850400	1·2713331	52
9	·5899012	·7305501	1·2384278	·6039038	·7576668	1·2546151	·6177224	·7855103	1·2716235	51
10	·5901361	0·7309963	1·2386911	·6041356	0·7581248	1·2548917	·6179511	0·7859808	1·2719142	50
11	·5903709	·7314428	1·2389546	·6043674	·7585829	1·2551685	·6181798	·7864515	1·2722052	49
12	·5906057	·7318894	1·2392183	·6045991	·7590413	1·2554456	·6184084	·7869224	1·2724963	48
13	·5908404	·7323362	1·2394823	·6048308	·7594999	1·2557229	·6186370	·7873935	1·2727877	47
14	·5910750	·7327832	1·2397464	·6050624	·7599587	1·2560005	·6188655	·7878649	1·2730794	46
15	·5913096	·7332303	1·2400108	·6052940	·7604177	1·2562782	·6190939	·7883364	1·2733712	45
16	·5915442	·7336777	1·2402754	·6055255	·7608769	1·2565562	·6193224	·7888082	1·2736634	44
17	·5917787	·7341253	1·2405402	·6057570	·7613363	1·2568345	·6195507	·7892802	1·2739557	43
18	·5920132	·7345730	1·2408052	·6059884	·7617959	1·2571129	·6197790	·7897524	1·2742484	42
19	·5922476	·7350210	1·2410704	·6062198	·7622557	1·2573916	·6200073	·7902248	1·2745412	41
20	·5924819	0·7354691	1·2413359	·6064511	0·7627157	1·2576705	·6202355	0·7906975	1·2748343	40
21	·5927163	·7359174	1·2416016	·6066824	·7631759	1·2579497	·6204636	·7911703	1·2751276	39
22	·5929505	·7363660	1·2418675	·6069136	·7636363	1·2582291	·6206917	·7916434	1·2754212	38
23	·5931847	·7368147	1·2421336	·6071447	·7640969	1·2585087	·6209198	·7921167	1·2757151	37
24	·5934189	·7372636	1·2423999	·6073758	·7645577	1·2587885	·6211478	·7925902	1·2760091	36
25	·5936530	·7377127	1·2426665	·6076069	·7650188	1·2590686	·6213757	·7930640	1·2763034	35
26	·5938871	·7381620	1·2429333	·6078379	·7654800	1·2593489	·6216036	·7935379	1·2765980	34
27	·5941211	·7386115	1·2432003	·6080689	·7659414	1·2596294	·6218314	·7940121	1·2768928	33
28	·5943550	·7390611	1·2434675	·6082998	·7664031	1·2599102	·6220592	·7944865	1·2771878	32
29	·5945889	·7395110	1·2437349	·6085306	·7668649	1·2601912	·6222870	·7949611	1·2774831	31
30	·5948228	0·7399611	1·2440026	·6087614	0·7673270	1·2604724	·6225146	0·7954359	1·2777787	30
31	·5950566	·7404113	1·2442704	·6089922	·7677893	1·2607539	·6227423	·7959110	1·2780744	29
32	·5952904	·7408618	1·2445385	·6092229	·7682517	1·2610356	·6229698	·7963862	1·2783705	28
33	·5955241	·7413124	1·2448069	·6094535	·7687144	1·2613175	·6231974	·7968617	1·2786667	27
34	·5957577	·7417633	1·2450754	·6096841	·7691773	1·2615997	·6234248	·7973374	1·2789632	26
35	·5959913	·7422143	1·2453442	·6099147	·7696404	1·2618820	·6236522	·7978134	1·2792600	25
36	·5962249	·7426655	1·2456131	·6101452	·7701037	1·2621647	·6238796	·7982895	1·2795570	24
37	·5964584	·7431170	1·2458823	·6103756	·7705672	1·2624475	·6241069	·7987659	1·2798543	23
38	·5966918	·7435686	1·2461518	·6106060	·7710309	1·2627306	·6243342	·7992425	1·2801518	22
39	·5969252	·7440204	1·2464214	·6108363	·7714948	1·2630140	·6245614	·7997193	1·2804495	21
40	·5971586	0·7444724	1·2466913	·6110666	0·7719589	1·2632975	·6247885	0·8001963	1·2807475	20
41	·5973919	·7449246	1·2469614	·6112969	·7724233	1·2635813	·6250156	·8006736	1·2810457	19
42	·5976251	·7453770	1·2472317	·6115270	·7728878	1·2638653	·6252427	·8011511	1·2813442	18
43	·5978583	·7458296	1·2475022	·6117572	·7733526	1·2641496	·6254696	·8016288	1·2816430	17
44	·5980915	·7462824	1·2477730	·6119873	·7738176	1·2644341	·6256966	·8021067	1·2819419	16
45	·5983246	·7467354	1·2480440	·6122173	·7742827	1·2647188	·6259235	·8025849	1·2822412	15
46	·5985577	·7471886	1·2483152	·6124473	·7747481	1·2650038	·6261503	·8030632	1·2825407	14
47	·5987906	·7476420	1·2485866	·6126772	·7752137	1·2652890	·6263771	·8035418	1·2828404	13
48	·5990236	·7480956	1·2488583	·6129071	·7756795	1·2655745	·6266038	·8040206	1·2831404	12
49	·5992565	·7485494	1·2491302	·6131369	·7761455	1·2658601	·6268305	·8044997	1·2834406	11
50	·5994893	0·7490033	1·2494023	·6133666	0·7766118	1·2661460	·6270571	0·8049790	1·2837411	10
51	·5997221	·7494575	1·2496746	·6135964	·7770782	1·2664322	·6272837	·8054584	1·2840418	9
52	·5999549	·7499119	1·2499471	·6138260	·7775448	1·2667186	·6275102	·8059382	1·2843428	8
53	·6001876	·7503665	1·2502199	·6140556	·7780117	1·2670052	·6277366	·8064181	1·2846440	7
54	·6004202	·7508212	1·2504929	·6142852	·7784788	1·2672921	·6279631	·8068983	1·2849455	6
55	·6006528	·7512762	1·2507661	·6145147	·7789460	1·2675792	·6281894	·8073787	1·2852472	5
56	·6008854	·7517314	1·2510396	·6147442	·7794135	1·2678665	·6284157	·8078593	1·2855492	4
57	·6011179	·7521867	1·2513133	·6149736	·7798812	1·2681541	·6286420	·8083401	1·2858514	3
58	·6013503	·7526423	1·2515872	·6152029	·7803492	1·2684419	·6288682	·8088212	1·2861539	2
59	·6015827	·7530981	1·2518613	·6154322	·7808173	1·2687299	·6290943	·8093025	1·2864566	1
60	·6018150	0·7535541	1·2521357	·6156615	0·7812856	1·2690182	·6293204	0·8097840	1·2867596	0
′	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	′
	53°			52°			51°			

Natural Sines, Tangents, Secants, &c.

′	39°			40°			41°			′
	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	
0	·6293204	0·8097840	1·2867596	·6427876	0·8390996	1·3054073	·6560590	0·8692867	1·3250130	60
1	·6295464	·8102658	1·2870628	·6430104	·8395955	1·3057261	·6562785	·8697976	1·3253482	59
2	·6297724	·8107478	1·2873663	·6432332	·8400915	1·3060451	·6564980	·8703087	1·3256837	58
3	·6299983	·8112300	1·2876700	·6434559	·8405878	1·3063644	·6567174	·8708200	1·3260194	57
4	·6302242	·8117124	1·2879740	·6436785	·8410844	1·3066839	·6569367	·8713316	1·3263554	56
5	·6304500	·8121951	1·2882782	·6439011	·8415812	1·3070038	·6571560	·8718435	1·3266918	55
6	·6306758	·8126780	1·2885827	·6441236	·8420782	1·3073239	·6573752	·8723556	1·3270284	54
7	·6309015	·8131611	1·2888875	·6443461	·8425755	1·3076442	·6575944	·8728680	1·3273653	53
8	6311272	·8136444	1·2891925	·6445685	·8430730	1·3079649	·6578135	·8733806	1·3277024	52
9	·6313528	·8141280	1·2894977	·6447909	·8435708	1·3082858	·6580326	·8738935	1·3280399	51
10	·6315784	0·8146118	1·2898032	·6450132	0·8440688	1·3086069	·6582516	0·8744067	1·3283776	50
11	·6318039	·8150958	1·2901090	·6452355	·8445670	1·3089284	·6584706	·8749201	1·3287156	49
12	·6320293	·8155801	1·2904150	·6454577	·8450655	1·3092501	·6586895	·8754338	1·3290539	48
13	·6322547	·8160646	1·2907213	·6456798	·8455643	1·3095720	·6589083	·8759478	1·3293925	47
14	·6324800	·8165493	1·2910278	·6459019	·8460633	1·3098943	·6591271	·8764620	1·3297314	46
15	·6327053	·8170343	1·2913346	·6461240	·8465625	1·3102168	·6593458	·8769765	1·3300706	45
16	·6329306	·8175195	1·2916416	·6463460	·8470620	1·3105396	·6595645	·8774912	1·3304100	44
17	·6331557	·8180049	1·2919489	·6465679	·8475617	1·3108626	·6597831	·8780062	1·3307497	43
18	·6333809	·8184905	1·2922564	·6467898	·8480617	1·3111860	·6600017	·8785215	1·3310897	42
19	·6336059	·8189764	1·2925642	·6470116	·8485619	1·3115095	·6602202	·8790370	1·3314301	41
20	·6338310	0·8194625	1·2928723	·6472334	0·8490624	1·3118334	·6604386	0·8795528	1·3317707	40
21	·6340559	·8199488	1·2931806	·6474551	·8495631	1·3121575	·6606570	·8800688	1·3321115	39
22	·6342808	·8204354	1·2934892	·6476767	·8500640	1·3124820	·6608754	·8805852	1·3324527	38
23	·6345057	·8209222	1·2937980	·6478984	·8505653	1·3128066	·6610936	·8811017	1·3327942	37
24	·6347305	·8214093	1·2941071	·6481199	·8510667	1·3131316	·6613119	·8816186	1·3331359	36
25	·6349553	·8218965	1·2944164	·6483414	·8515684	1·3134568	·6615300	·8821357	1·3334779	35
26	·6351800	·8223840	1·2947260	·6485628	·8520704	1·3137823	·6617482	·8826531	1·3338203	34
27	·6354046	·8228718	1·2950359	·6487842	·8525726	1·3141081	·6619662	·8831707	1·3341629	33
28	·6356292	·8233597	1·2953460	·6490056	·8530750	1·3144341	·6621842	·8836886	1·3345058	32
29	·6358537	·8238479	1·2956564	·6492268	·8535777	1·3147604	·6624022	·8842068	1·3348489	31
30	·6360782	0·8243364	1·2959670	·6494480	0·8540807	1·3150870	·6626200	0·8847253	1·3351924	30
31	·6363026	·8248251	1·2962779	·6496692	·8545839	1·3154139	·6628379	·8852440	1·3355362	29
32	·6365270	·8253140	1·2965890	·6498903	·8550873	1·3157410	·6630557	·8857630	1·3358802	28
33	·6367513	·8258031	1·2969004	·6501114	·8555910	1·3160684	·6632734	·8862822	1·3362246	27
34	·6369756	·8262925	1·2972121	·6503324	·8560950	1·3163961	·6634910	·8868017	1·3365692	26
35	·6371998	·8267821	1·2975240	·6505533	·8565992	1·3167240	·6637087	·8873215	1·3369141	25
36	·6374240	·8272719	1·2978362	·6507742	·8571037	1·3170523	·6639262	·8878415	1·3372594	24
37	·6376481	·8277620	1·2981487	·6509951	·8576084	1·3173808	·6641437	·8883619	1·3376049	23
38	·6378721	·8282523	1·2984614	·6512158	·8581133	1·3177096	·6643612	·8888825	1·3379507	22
39	·6380961	·8287429	1·2987743	·6514366	·8586185	1·3180386	·6645785	·8894033	1·3382968	21
40	·6383201	0·8292337	1·2990876	·6516572	0·8591240	1·3183680	·6647959	0·8899244	1·3386432	20
41	·6385440	·8297247	1·2994011	·6518778	·8596297	1·3186976	·6650131	·8904458	1·3389898	19
42	·6387678	·8302160	1·2997148	·6520984	·8601357	1·3190274	·6652304	·8909675	1·3393368	18
43	·6389916	·8307075	1·3000288	·6523189	·8606419	1·3193576	·6654475	·8914894	1·3396841	17
44	·6392153	·8311992	1·3003431	·6525394	·8611484	1·3196881	·6656646	·8920116	1·3400316	16
45	·6394390	·8316912	1·3006576	·6527598	·8616551	1·3200188	·6658817	·8925341	1·3403795	15
46	·6396626	·8321834	1·3009724	·6529801	·8621621	1·3203498	·6660987	·8930569	1·3407276	14
47	·6398862	·8326759	1·3012875	·6532004	·8626694	1·3206810	·6663156	·8935799	1·3410761	13
48	·6401097	·8331686	1·3016028	·6534206	·8631768	1·3210126	·6665325	·8941032	1·3414248	12
49	·6403332	·8336615	1·3019184	·6536408	·8636846	1·3213444	·6667493	·8946268	1·3417738	11
50	·6405566	0·8341547	1·3022343	·6538609	0·8641926	1·3216765	·6669661	0·8951506	1·3421232	10
51	·6407799	·8346481	1·3025504	·6540810	·8647009	1·3220089	·6671828	·8956747	1·3424728	9
52	·6410032	·8351418	1·3028667	·6543010	·8652094	1·3223416	·6673994	·8961991	1·3428227	8
53	·6412264	·8356357	1·3031834	·6545209	·8657181	1·3226745	·6676160	·8967238	1·3431729	7
54	·6414496	·8361298	1·3035003	·6547408	·8662272	1·3230078	·6678326	·8972487	1·3435234	6
55	·6416728	·8366242	1·3038175	·6549607	·8667365	1·3233413	·6680490	·8977739	1·3438742	5
56	·6418958	·8371188	1·3041349	·6551804	·8672460	1·3236750	·6682655	·8982994	1·3442253	4
57	·6421189	·8376136	1·3044526	·6554002	·8677558	1·3240091	·6684818	·8988251	1·3445767	3
58	·6423418	·8381087	1·3047706	·6556198	·8682659	1·3243435	·6686981	·8993512	1·3449284	2
59	·6425647	·8386041	1·3050888	·6558395	·8687762	1·3246781	·6689144	·8998775	1·3452804	1
60	·6427876	0·8390996	1·3054073	·6560590	0·8692867	1·3250130	·6691306	0·9004040	1·3456327	0
′	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	′
	50°			49°			48°			

Natural Sines, Tangents, Secants, &c.

′	42°			43°			44°			′
	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	
0	·6691306	0·9004040	1·3456327	·6819984	0·9325151	1·3673275	·6946584	0·9656888	1·3901636	60
1	·6693468	·9009309	1·3459853	·6822111	·9330591	1·3676985	·6948676	·9662511	1·3905543	59
2	·6695628	·9014580	1·3463382	·6824237	·9336034	1·3680699	·6950767	·9668137	1·3909453	58
3	·6697789	·9019854	1·3466914	·6826363	·9341479	1·3684416	·6952858	·9673767	1·3913366	57
4	·6699948	·9025131	1·3470449	·6828489	·9346928	1·3688136	·6954949	·9679399	1·3917283	56
5	·6702108	·9030411	1·3473987	·6830613	·9352380	1·3691859	·6957039	·9685035	1·3921203	55
6	·6704266	·9035693	1·3477528	·6832738	·9357834	1·3695586	·6959128	·9690674	1·3925127	54
7	·6706424	·9040979	1·3481072	·6834861	·9363292	1·3699315	·6961217	·9696316	1·3929054	53
8	·6708582	·9046267	1·3484619	·6836984	·9368753	1·3703048	·6963305	·9701962	1·3932985	52
9	·6710739	·9051557	1·3488168	·6839107	·9374216	1·3706784	·6965392	·9707610	1·3936918	51
10	·6712895	0·9056851	1·3491721	·6841229	0·9379683	1·3710523	·6967479	0·9713262	1·3940856	50
11	·6715051	·9062147	1·3495277	·6843350	·9385153	1·3714266	·6969565	·9718917	1·3944796	49
12	·6717206	·9067446	1·3498836	·6845471	·9390625	1·3718011	·6971651	·9724575	1·3948740	48
13	·6719361	·9072748	1·3502398	·6847591	·9396101	1·3721760	·6973736	·9730236	1·3952688	47
14	·6721515	·9078053	1·3505963	·6849711	·9401579	1·3725512	·6975821	·9735901	1·3956639	46
15	·6723668	·9083360	1·3509531	·6851830	·9407061	1·3729268	·6977905	·9741569	1·3960593	45
16	·6725821	·9088671	1·3513102	·6853948	·9412545	1·3733026	·6979988	·9747240	1·3964551	44
17	·6727973	·9093984	1·3516677	·6856066	·9418033	1·3736788	·6982071	·9752914	1·3968512	43
18	·6730125	·9099300	1·3520254	·6858184	·9423523	1·3740553	·6984153	·9758591	1·3972477	42
19	·6732276	·9104619	1·3523834	·6860300	·9429017	1·3744321	·6986234	·9764272	1·3976445	41
20	·6734427	0·9109940	1·3527417	·6862416	0·9434513	1·3748092	·6988315	0·9769956	1.3980416	40
21	·6736577	·9115265	1·3531003	·6864532	·9440013	1·3751867	·6990396	·9775643	1·3984391	39
22	·6738727	·9120592	1·3534593	·6866647	·9445516	1·3755645	·6992476	·9781333	1·3988369	38
23	·6740876	·9125922	1·3538185	·6868761	·9451021	1·3759426	·6994555	·9787027	1·3992351	37
24	·6743024	·9131255	1·3541780	·6870875	·9456530	1·3763210	·6996633	·9792724	1·3996336	36
25	·6745172	·9136591	1·3545379	·6872988	·9462042	1·3766998	·6998711	·9798424	1·4000325	35
26	·6747319	·9141929	1·3548980	·6875101	·9467556	1·3770789	·7000789	·9804127	1·4004317	34
27	·6749466	·9147270	1·3552585	·6877213	·9473074	1·3774583	·7002866	·9809833	1·4008313	33
28	·6751612	·9152615	1·3556193	·6879325	·9478595	1·3778380	·7004942	·9815543	1·4012312	32
29	·6753757	·9157962	1·3559803	·6881435	·9484119	1·3782181	·7007018	·9821256	1·4016315	31
30	·6755902	0·9163312	1·3563417	·6883546	0·9489646	1·3785985	·7009093	0·9826973	1·4020321	30
31	·6758046	·9168665	1·3567034	·6885655	·9495176	1·3789792	·7011167	·9832692	1·4024330	29
32	·6760190	·9174020	1·3570654	·6887765	·9500709	1·3793602	·7013241	·9838415	1·4028343	28
33	·6762333	·9179379	1·3574277	·6889873	·9506245	1·3797416	·7015314	·9844141	1·4032360	27
34	·6764476	·9184740	1·3577903	·6891981	·9511784	1·3801233	·7017387	·9849871	1·4036380	26
35	·6766618	·9190104	1·3581532	·6894089	·9517326	1·3805053	·7019459	·9855603	1·4040403	25
36	·6768760	·9195471	1·3585164	·6896195	·9522871	1·3808877	·7021531	·9861339	1·4044430	24
37	·6770901	·9200841	1·3588800	·6898302	·9528420	1·3812704	·7023601	·9867079	1·4048461	23
38	·6773041	·9206214	1·3592438	·6900407	·9533971	1·3816534	·7025672	·9872821	1·4052494	22
39	·6775181	·9211590	1.3596080	·6902512	·9539526	1·3820367	·7027741	·9878567	1·4056532	21
40	·6777320	0·9216969	1·3599725	·6904617	0·9545083	1·3824204	·7029811	0·9884316	1·4060573	20
41	·6779459	·9222350	1·3603372	·6906721	·9550644	1·3828044	·7031879	·9890069	1·4064617	19
42	·6781597	·9227734	1·3607023	·6908824	·9556208	1·3831887	·7033947	·9895825	1·4068665	18
43	·6783734	·9233122	1·3610677	·6910927	·9561774	1·3835734	·7036014	·9901584	1·4072717	17
44	·6785871	·9238512	1·3614334	·6913029	·9567344	1·3839584	·7038081	·9907346	1·4076772	16
45	·6788007	·9243905	1·3617995	·6915131	·9572917	1·3843437	·7040147	·9913112	1·4080831	15
46	·6790143	·9249301	1·3621658	·6917232	·9578494	1·3847294	·7042213	·9918881	1·4084893	14
47	·6792278	·9254700	1·3625324	·6919332	·9584073	1·3851153	·7044278	·9924654	1·4088958	13
48	·6794413	·9260102	1·3628994	·6921432	·9589655	1·3855017	·7046342	·9930429	1·4093028	12
49	·6796547	·9265506	1·3632667	·6923531	·9595241	1·3858883	·7048406	·9936208	1·4097100	11
50	·6798681	0·9270914	1·3636343	·6925630	0·9600829	1·3862753	·7050469	0·9941991	1·4101177	10
51	·6800813	·9276324	1·3640022	·6927728	·9606421	1·3866626	·7052532	·9947777	1·4105257	9
52	·6802946	·9281738	1·3643704	·6929825	·9612016	1·3870503	·7054594	·9953566	1·4109340	8
53	·6805078	·9287154	1·3647389	·6931922	·9617614	1·3874383	·7056655	·9959358	1·4113427	7
54	·6807209	·9292573	1·3651078	·6934018	·9623215	1·3878266	·7058716	·9965154	1·4117517	6
55	·6809339	·9297996	1·3654770	·6936114	·9628819	1·3882153	·7060776	·9970953	1·4121612	5
56	·6811469	·9303421	1·3658464	·6938209	·9634427	1·3886043	·7062835	·9976756	1·4125709	4
57	·6813599	·9308849	1·3662162	·6940304	·9640037	1·3889936	·7064894	·9982562	1·4129810	3
58	·6815728	·9314280	1·3665863	·6942398	·9645651	1·3893832	·7066953	·9988371	1·4133915	2
59	·6817856	·9319714	1·3669567	·6944491	·9651268	1·3897733	·7069011	·9994184	1·4138024	1
60	·6819984	0·9325151	1·3673275	·6946584	0·9656888	1·3901636	·7071068	1·0000000	1·4142136	0
′	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	′
	47°			46°			45°			

Natural Sines, Tangents, Secants, &c.

′	45°			46°			47°			′
	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	
0	·7071068	1·0000000	1·4142136	·7193398	1·0355303	1·4395565	·7313537	1·0723687	1·4662792	60
1	·7073124	1·0005819	1·4146251	·7195418	1·0361333	1·4399904	·7315521	1·0729943	1·4667368	59
2	·7075180	1·0011642	1·4150370	·7197438	1·0367367	1·4404246	·7317503	1·0736203	1·4671948	58
3	·7077236	1·0017469	1·4154493	·7199457	1·0373404	1·4408592	·7319486	1·0742467	1·4676532	57
4	·7079291	1·0023298	1·4158619	·7201476	1·0379445	1·4412941	·7321467	1·0748734	1·4681120	56
5	·7081345	1·0029131	1·4162749	·7203494	1·0385489	1·4417295	·7323449	1·0755006	1·4685713	55
6	·7083398	1·0034968	1·4166883	·7205511	1·0391538	1·4421652	·7325429	1·0761282	1·4690309	54
7	·7085451	1·0040807	1·4171020	·7207528	1·0397589	1·4426013	·7327409	1·0767561	1·4694910	53
8	·7087504	1·0046651	1·4175161	·7209544	1·0403645	1·4430379	·7329388	1·0773845	1·4699514	52
9	·7089556	1·0052497	1·4179306	·7211559	1·0409704	1·4434748	·7331367	1·0780132	1·4704123	51
10	·7091607	1·0058348	1·4183454	·7213574	1·0415767	1·4439120	·7333345	1·0786423	1·4708736	50
11	·7093657	1·0064201	1·4187605	·7215589	1·0421833	1·4443497	·7335322	1·0792718	1·4713354	49
12	·7095707	1·0070058	1·4191761	·7217602	1·0427904	1·4447878	·7337299	1·0799018	1·4717975	48
13	·7097757	1·0075918	1·4195920	·7219615	1·0433977	1·4452262	·7339275	1·0805321	1·4722600	47
14	·7099806	1·0081782	1·4200082	·7221628	1·0440055	1·4456651	·7341250	1·0811628	1·4727230	46
15	·7101854	1·0087649	1·4204248	·7223640	1·0446136	1·4461043	·7343225	1·0817939	1·4731864	45
16	·7103901	1·0093520	1·4208418	·7225651	1·0452221	1·4465439	·7345199	1·0824254	1·4736502	44
17	·7105948	1·0099394	1·4212592	·7227661	1·0458310	1·4469839	·7347173	1·0830573	1·4741144	43
18	·7107995	1·0105272	1·4216769	·7229671	1·0464402	1·4474243	·7349146	1·0836896	1·4745790	42
19	·7110041	1·0111153	1·4220950	·7231681	1·0470498	1·4478651	·7351118	1·0843223	1·4750440	41
20	·7112086	1·0117038	1·4225134	·7233690	1·0476598	1·4483063	·7353090	1·0849554	1·4755095	40
21	·7114130	1·0122925	1·4229323	·7235698	1·0482702	1·4487478	·7355061	1·0855889	1·4759754	39
22	·7116174	1·0128817	1·4233514	·7237705	1·0488809	1·4491898	·7357032	1·0862228	1·4764417	38
23	·7118218	1·0134712	1·4237710	·7239712	1·0494920	1·4496322	·7359002	1·0868571	1·4769084	37
24	·7120260	1·0140610	1·4241909	·7241719	1·0501034	1·4500749	·7360971	1·0874918	1·4773755	36
25	·7122303	1·0146512	1·4246112	·7243724	1·0507153	1·4505181	·7362940	1·0881269	1·4778431	35
26	·7124344	1·0152418	1·4250319	·7245729	1·0513275	1·4509616	·7364908	1·0887624	1·4783111	34
27	·7126385	1·0158326	1·4254529	·7247734	1·0519401	1·4514055	·7366875	1·0893984	1·4787795	33
28	·7128426	1·0164239	1·4258743	·7249738	1·0525531	1·4518498	·7368842	1·0900347	1·4792483	32
29	·7130465	1·0170155	1·4262961	·7251741	1·0531664	1·4522946	·7370808	1·0906714	1·4797176	31
30	·7132504	1·0176074	1·4267182	·7253744	1·0537801	1·4527397	·7372773	1·0913085	1·4801872	30
31	·7134543	1·0181997	1·4271407	·7255746	1·0543942	1·4531852	·7374738	1·0919460	1·4806573	29
32	·7136581	1·0187923	1·4275636	·7257747	1·0550087	1·4536311	·7376703	1·0925840	1·4811278	28
33	·7138618	1·0193853	1·4279868	·7259748	1·0556235	1·4540774	·7378666	1·0932223	1·4815988	27
34	·7140655	1·0199786	1·4284105	·7261748	1·0562388	1·4545241	·7380629	1·0938610	1·4820702	26
35	·7142691	1·0205723	1·4288345	·7263748	1·0568544	1·4549712	·7382592	1·0945002	1·4825420	25
36	·7144727	1·0211664	1·4292588	·7265747	1·0574704	1·4554187	·7384553	1·0951397	1·4830142	24
37	·7146762	1·0217608	1·4296836	·7267745	1·0580867	1·4558666	·7386515	1·0957797	1·4834868	23
38	·7148796	1·0223555	1·4301087	·7269743	1·0587035	1·4563149	·7388475	1·0964201	1·4839599	22
39	·7150830	1·0229506	1·4305342	·7271740	1·0593206	1·4567636	·7390435	1·0970609	1·4844334	21
40	·7152863	1·0235461	1·4309600	·7273736	1·0599381	1·4572127	·7392394	1·0977020	1·4849073	20
41	·7154895	1·0241419	1·4313863	·7275732	1·0605560	1·4576621	·7394353	1·0983436	1·4853817	19
42	·7156927	1·0247381	1·4318129	·7277728	1·0611742	1·4581120	·7396311	1·0989857	1·4858565	18
43	·7158959	1·0253346	1·4322399	·7279722	1·0617929	1·4585623	·7398268	1·0996281	1·4863317	17
44	·7160989	1·0259315	1·4326672	·7281716	1·0624119	1·4590130	·7400225	1·1002709	1·4868073	16
45	·7163019	1·0265287	1·4330950	·7283710	1·0630313	1·4594641	·7402181	1·1009141	1·4872834	15
46	·7165049	1·0271263	1·4335231	·7285703	1·0636511	1·4599156	·7404137	1·1015578	1·4877599	14
47	·7167078	1·0277243	1·4339516	·7287695	1·0642713	1·4603675	·7406092	1·1022019	1·4882369	13
48	·7169106	1·0283226	1·4343805	·7289686	1·0648918	1·4608198	·7408046	1·1028463	1·4887142	12
49	·7171134	1·0289212	1·4348097	·7291677	1·0655128	1·4612726	·7410000	1·1034912	1·4891920	11
50	·7173161	1·0295203	1·4352393	·7293668	1·0661341	1·4617257	·7411953	1·1041365	1·4896703	10
51	·7175187	1·0301196	1·4356693	·7295657	1·0667558	1·4621792	·7413905	1·1047823	1·4901489	9
52	·7177213	1·0307194	1·4360997	·7297646	1·0673779	1·4626331	·7415857	1·1054284	1·4906280	8
53	·7179238	1·0313195	1·4365305	·7299635	1·0680004	1·4630875	·7417808	1·1060750	1·4911076	7
54	·7181263	1·0319199	1·4369616	·7301623	1·0686233	1·4635422	·7419758	1·1067219	1·4915876	6
55	·7183287	1·0325208	1·4373932	·7303610	1·0692466	1·4639973	·7421708	1·1073693	1·4920680	5
56	·7185310	1·0331220	1·4378251	·7305597	1·0698702	1·4644529	·7423658	1·1080171	1·4925488	4
57	·7187333	1·0337235	1·4382574	·7307583	1·0704943	1·4649089	·7425606	1·1086653	1·4930301	3
58	·7189355	1·0343254	1·4386900	·7309568	1·0711187	1·4653652	·7427554	1·1093140	1·4935118	2
59	·7191377	1·0349277	1·4391231	·7311553	1·0717435	1·4658220	·7429502	1·1099630	1·4939940	1
60	·7193398	1·0355303	1·4395565	·7313537	1·0723687	1·4662792	·7431448	1·1106125	1·4944765	0
′	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	′
	44°			43°			42°			

Natural Sines, Tangents, Secants, &c.

′	48°			49°			50°			′
	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	
0	·7431448	1·1106125	1·4944765	·7547096	1·1503684	1·5242531	·7660444	1·1917536	1·5557238	60
1	·7433394	1·1112624	1·4949596	·7549004	1·1510445	1·5247634	·7662314	1·1924579	1·5562634	59
2	·7435340	1·1119127	1·4954431	·7550911	1·1517210	1·5252741	·7664183	1·1931626	1·5568035	58
3	·7437285	1·1125635	1·4959270	·7552818	1·1523979	1·5257854	·7666051	1·1938679	1·5573441	57
4	·7439229	1·1132146	1·4964113	·7554724	1·1530754	1·5262971	·7667918	1·1945736	1·5578852	56
5	·7441173	1·1138662	1·4968961	·7556630	1·1537532	1·5268093	·7669785	1·1952799	1·5584268	55
6	·7443115	1·1145182	1·4973813	·7558535	1·1544316	1·5273219	·7671652	1·1959866	1·5589689	54
7	·7445058	1·1151706	1·4978670	·7560439	1·1551104	1·5278351	·7673517	1·1966938	1·5595115	53
8	·7446999	1·1158235	1·4983531	·7562343	1·1557896	1·5283487	·7675382	1·1974015	1·5600546	52
9	·7448941	1·1164768	1·4988397	·7564246	1·1564693	1·5288627	·7677246	1·1981097	1·5605982	51
10	·7450881	1·1171305	1·4993267	·7566148	1·1571495	1·5293773	·7679110	1·1988184	1·5611424	50
11	·7452821	1·1177846	1·4998141	·7568050	1·1578301	1·5298923	·7680973	1·1995276	1·5616871	49
12	·7454760	1·1184391	1·5003020	·7569951	1·1585112	1·5304078	·7682835	1·2002373	1·5622322	48
13	·7456699	1·1190941	1·5007903	·7571851	1·1591927	1·5309238	·7684697	1·2009475	1·5627779	47
14	·7458636	1·1197495	1·5012791	·7573751	1·1598747	1·5314403	·7686558	1·2016581	1·5633241	46
15	·7460574	1·1204053	1·5017683	·7575650	1·1605571	1·5319572	·7688418	1·2023693	1·5638708	45
16	·7462510	1·1210616	1·5022580	·7577548	1·1612400	1·5324746	·7690278	1·2030810	1·5644181	44
17	·7464446	1·1217183	1·5027481	·7579446	1·1619234	1·5329925	·7692137	1·2037932	1·5649658	43
18	·7466382	1·1223754	1·5032387	·7581343	1·1626073	1·5335109	·7693996	1·2045058	1·5655141	42
19	·7468317	1·1230329	1·5037297	·7583240	1·1632916	1·5340297	·7695853	1·2052190	1·5660628	41
20	·7470251	1·1236909	1·5042211	·7585136	1·1639763	1·5345491	·7697710	1·2059327	1·5666121	40
21	·7472184	1·1243493	1·5047131	·7587031	1·1646615	1·5350689	·7699567	1·2066468	1·5671619	39
22	·7474117	1·1250081	1·5052054	·7588926	1·1653472	1·5355892	·7701423	1·2073615	1·5677123	38
23	·7476049	1·1256674	1·5056982	·7590820	1·1660334	1·5361100	·7703278	1·2080767	1·5682631	37
24	·7477981	1·1263271	1·5061915	·7592713	1·1667200	1·5366313	·7705132	1·2087924	1·5688145	36
25	·7479912	1·1269872	1·5066852	·7594606	1·1674071	1·5371530	·7706986	1·2095085	1·5693664	35
26	·7481842	1·1276478	1·5071793	·7596498	1·1680947	1·5376752	·7708840	1·2102252	1·5699188	34
27	·7483772	1·1283088	1·5076739	·7598389	1·1687827	1·5381980	·7710692	1·2109424	1·5704717	33
28	·7485701	1·1289702	1·5081690	·7600280	1·1694712	1·5387212	·7712544	1·2116601	1·5710252	32
29	·7487629	1·1296321	1·5086645	·7602170	1·1701601	1·5392449	·7714395	1·2123783	1·5715792	31
30	·7489557	1·1302944	1·5091605	·7604060	1·1708496	1·5397690	·7716246	1·2130970	1·5721337	30
31	·7491484	1·1309571	1·5096569	·7605949	1·1715395	1·5402937	·7718096	1·2138162	1·5726887	29
32	·7493411	1·1316203	1·5101538	·7607837	1·1722298	1·5408189	·7719945	1·2145359	1·5732443	28
33	·7495337	1·1322839	1·5106511	·7609724	1·1729207	1·5413445	·7721794	1·2152562	1·5738004	27
34	·7497262	1·1329479	1·5111489	·7611611	1·1736120	1·5418706	·7723642	1·2159769	1·5743570	26
35	·7499187	1·1336124	1·5116472	·7613497	1·1743038	1·5423973	·7725489	1·2166982	1·5749141	25
36	·7501111	1·1342773	1·5121459	·7615383	1·1749960	1·5429244	·7727336	1·2174199	1·5754718	24
37	·7503034	1·1349427	1·5126450	·7617268	1·1756888	1·5434520	·7729182	1·2181422	1·5760300	23
38	·7504957	1·1356085	1·5131446	·7619152	1·1763820	1·5439801	·7731027	1·2188650	1·5765887	22
39	·7506879	1·1362747	1·5136447	·7621036	1·1770756	1·5445087	·7732872	1·2195883	1·5771479	21
40	·7508800	1·1369414	1·5141452	·7622919	1·1777698	1·5450378	·7734716	1·2203121	1·5777077	20
41	·7510721	1·1376086	1·5146462	·7624802	1·1784644	1·5455673	·7736559	1·2210364	1·5782680	19
42	·7512641	1·1382761	1·5151477	·7626683	1·1791595	1·5460974	·7738402	1·2217613	1·5788289	18
43	·7514561	1·1389441	1·5156496	·7628564	1·1798551	1·5466280	·7740244	1·2224866	1·5793902	17
44	·7516480	1·1396126	1·5161520	·7630445	1·1805512	1·5471590	·7742086	1·2232125	1·5799521	16
45	·7518398	1·1402815	1·5166548	·7632325	1·1812477	1·5476906	·7743926	1·2239389	1·5805146	15
46	·7520316	1·1409508	1·5171581	·7634204	1·1819447	1·5482226	·7745767	1·2246658	1·5810776	14
47	·7522233	1·1416206	1·5176619	·7636082	1·1826422	1·5487552	·7747606	1·2253932	1·5816411	13
48	·7524149	1·1422908	1·5181661	·7637960	1·1833402	1·5492882	·7749445	1·2261211	1·5822051	12
49	·7526065	1·1429615	1·5186708	·7639838	1·1840387	1·5498218	·7751283	1·2268496	1·5827697	11
50	·7527980	1·1436326	1·5191759	·7641714	1·1847376	1·5503558	·7753121	1·2275786	1·5833348	10
51	·7529894	1·1443041	1·5196815	·7643590	1·1854370	1·5508904	·7754957	1·2283081	1·5839005	9
52	·7531808	1·1449762	1·5201876	·7645465	1·1861369	1·5514254	·7756794	1·2290381	1·5844667	8
53	·7533721	1·1456486	1·5206942	·7647340	1·1868373	1·5519610	·7758629	1·2297687	1·5850334	7
54	·7535634	1·1463215	1·5212012	·7649214	1·1875382	1·5524970	·7760464	1·2304997	1·5856007	6
55	·7537546	1·1469949	1·5217087	·7651087	1·1882395	1·5530335	·7762298	1·2312313	1·5861685	5
56	·7539457	1·1476687	1·5222166	·7652960	1·1889414	1·5535706	·7764132	1·2319634	1·5867369	4
57	·7541368	1·1483429	1·5227250	·7654832	1·1896437	1·5541081	·7765965	1·2326961	1·5873058	3
58	·7543278	1·1490176	1·5232339	·7656704	1·1903465	1·5546462	·7767797	1·2334292	1·5878752	2
59	·7545187	1·1496928	1·5237433	·7658574	1·1910498	1·5551848	·7769629	1·2341629	1·5884452	1
60	·7547096	1·1503684	1·5242531	·7660444	1·1917536	1·5557238	·7771460	1·2348972	1·5890157	0
′	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	′
	41°			40°			39°			

Natural Sines, Tangents, Secants, &c.

′	51°			52°			53°			′
	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	
0	·7771460	1·2348972	1·5890157	·7880108	1·2799416	1·6242692	·7986355	1·3270448	1·6616401	60
1	·7773290	1·2356319	1·5895868	·7881898	1·2807094	1·6248743	·7988105	1·3278483	1·6622819	59
2	·7775120	1·2363672	1·5901584	·7883688	1·2814776	1·6254799	·7989855	1·3286524	1·6629243	58
3	·7776949	1·2371030	1·5907306	·7885477	1·2822465	1·6260861	·7991604	1·3294571	1·6635673	57
4	·7778777	1·2378393	1·5913033	·7887266	1·2830160	1·6266929	·7993352	1·3302624	1·6642110	56
5	·7780604	1·2385762	1·5918766	·7889054	1·2837860	1·6273003	·7995100	1·3310684	1·6648553	55
6	·7782431	1·2393136	1·5924504	·7890841	1·2845566	1·6279083	·7996847	1·3318750	1·6655002	54
7	·7784258	1·2400515	1·5930247	·7892627	1·2853277	1·6285169	·7998593	1·3326822	1·6661458	53
8	·7786084	1·2407900	1·5935996	·7894413	1·2860995	1·6291261	·8000338	1·3334900	1·6667920	52
9	·7787909	1·2415290	1·5941751	·7896198	1·2868718	1·6297359	·8002083	1·3342984	1·6674389	51
10	·7789733	1·2422685	1·5947511	·7897983	1·2876447	1·6303462	·8003827	1·3351075	1·6680864	50
11	·7791557	1·2430086	1·5953276	·7899767	1·2884182	1·6309572	·8005571	1·3359172	1·6687345	49
12	·7793380	1·2437492	1·5959048	·7901550	1·2891922	1·6315688	·8007314	1·3367276	1·6693833	48
13	·7795202	1·2444903	1·5964824	·7903333	1·2899669	1·6321809	·8009056	1·3375386	1·6700328	47
14	·7797024	1·2452320	1·5970606	·7905115	1·2907421	1·6327937	·8010797	1·3383502	1·6706828	46
15	·7798845	1·2459742	1·5976394	·7906896	1·2915179	1·6334070	·8012538	1·3391624	1·6713336	45
16	·7800665	1·2467169	1·5982187	·7908676	1·2922943	1·6340210	·8014278	1·3399753	1·6719850	44
17	·7802485	1·2474602	1·5987986	·7910456	1·2930713	1·6346355	·8016018	1·3407888	1·6726370	43
18	·7804304	1·2482040	1·5993790	·7912235	1·2938488	1·6352507	·8017756	1·3416029	1·6732897	42
19	·7806123	1·2489484	1·5999600	·7914014	1·2946270	1·6358664	·8019495	1·3424177	1·6739430	41
20	·7807940	1·2496933	1·6005416	·7915792	1·2954057	1·6364828	·8021232	1·3432331	1·6745970	40
21	·7809757	1·2504388	1·6011237	·7917569	1·2961850	1·6370997	·8022969	1·3440492	1·6752517	39
22	·7811574	1·2511848	1·6017064	·7919345	1·2969649	1·6377173	·8024705	1·3448658	1·6759070	38
23	·7813390	1·2519313	1·6022896	·7921121	1·2977454	1·6383355	·8026440	1·3456832	1·6765629	37
24	·7815205	1·2526784	1·6028734	·7922896	1·2985265	1·6389542	·8028175	1·3465011	1·6772195	36
25	·7817019	1·2534260	1·6034577	·7924671	1·2993081	1·6395736	·8029909	1·3473198	1·6778768	35
26	·7818833	1·2541742	1·6040426	·7926445	1·3000904	1·6401936	·8031642	1·3481390	1·6785347	34
27	·7820646	1·2549229	1·6046281	·7928218	1·3008733	1·6408142	·8033375	1·3489589	1·6791933	33
28	·7822459	1·2556721	1·6052142	·7929990	1·3016567	1·6414354	·8035107	1·3497794	1·6798525	32
29	·7824270	1·2564219	1·6058008	·7931762	1·3024407	1·6420572	·8036838	1·3506006	1·6805124	31
30	·7826082	1·2571723	1·6063879	·7933533	1·3032254	1·6426796	·8038569	1·3514224	1·6811730	30
31	·7827892	1·2579232	1·6069757	·7935304	1·3040106	1·6433027	·8040299	1·3522449	1·6818342	29
32	·7829702	1·2586747	1·6075640	·7937074	1·3047964	1·6439263	·8042028	1·3530680	1·6824961	28
33	·7831511	1·2594267	1·6081528	·7938843	1·3055828	1·6445506	·8043756	1·3538918	1·6831586	27
34	·7833320	1·2601792	1·6087423	·7940611	1·3063699	1·6451754	·8045484	1·3547162	1·6838219	26
35	·7835127	1·2609323	1·6093323	·7942379	1·3071575	1·6458009	·8047211	1·3555413	1·6844857	25
36	·7836935	1·2616860	1·6099228	·7944146	1·3079457	1·6464270	·8048938	1·3563670	1·6851503	24
37	·7838741	1·2624402	1·6105140	·7945913	1·3087345	1·6470537	·8050664	1·3571934	1·6858155	23
38	·7840547	1·2631950	1·6111057	·7947678	1·3095239	1·6476811	·8052389	1·3580204	1·6864814	22
39	·7842352	1·2639503	1·6116980	·7949444	1·3103140	1·6483090	·8054113	1·3588481	1·6871479	21
40	·7844157	1·2647062	1·6122908	·7951208	1·3111046	1·6489376	·8055837	1·3596764	1·6878151	20
41	·7845961	1·2654626	1·6128843	·7952972	1·3118958	1·6495668	·8057560	1·3605054	1·6884830	19
42	·7847764	1·2662196	1·6134783	·7954735	1·3126876	1·6501966	·8059283	1·3613350	1·6891516	18
43	·7849566	1·2669772	1·6140728	·7956497	1·3134801	1·6508270	·8061005	1·3621653	1·6898208	17
44	·7851368	1·2677353	1·6146680	·7958259	1·3142731	1·6514581	·8062726	1·3629963	1·6904907	16
45	·7853169	1·2684940	1·6152637	·7960020	1·3150668	1·6520898	·8064446	1·3638279	1·6911613	15
46	·7854970	1·2692532	1 6158600	·7961780	1·3158610	1·6527221	·8066166	1·3646602	1·6918326	14
47	·7856770	1·2700130	1·6164569	·7963540	1·3166559	1·6533550	·8067885	1·3654931	1·6925045	13
48	·7858569	1·2707733	1·6170544	·7965299	1·3174513	1·6539885	·8069603	1·3663267	1·6931771	12
49	·7860367	1·2715342	1·6176524	·7967058	1·3182474	1·6546227	·8071321	1·3671610	1·6938504	11
50	·7862165	1·2722957	1·6182510	·7968815	1·3190441	1·6552575	·8073038	1·3679959	1·6945244	10
51	·7863963	1·2730578	1·6188502	·7970572	1·3198414	1·6558929	·8074754	1·3688315	1·6951990	9
52	·7865759	1·2738204	1·6194500	·7972329	1·3206393	1·6565290	·8076470	1·3696678	1·6958744	8
53	·7867555	1·2745835	1·6200504	·7974084	1·3214379	1·6571657	·8078185	1·3705047	1·6965504	7
54	·7869350	1·2753473	1·6206513	·7975839	1·3222370	1·6578030	·8079899	1·3713423	1·6972271	6
55	·7871145	1·2761116	1·6212528	·7977594	1·3230368	1·6584409	·8081612	1·3721806	1·6979044	5
56	·7872939	1·2768765	1·6218549	·7979347	1·3238371	1·6590795	·8083325	1·3730195	1·6985825	4
57	·7874732	1·2776419	1·6224576	·7981100	1·3246381	1·6597187	·8085037	1·3738591	1·6992612	3
58	·7876524	1·2784079	1·6230609	·7982853	1·3254397	1·6603586	·8086749	1·3746994	1·6999407	2
59	·7878316	1·2791745	1·6236648	·7984604	1·3262420	1·6609990	·8088460	1·3755403	1·7006208	1
60	·7880108	1·2799416	1·6242692	·7986355	1·3270448	1·6616401	·8090170	1·3763819	1·7013016	0
′	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	′
	38°			37°			36°			

Natural Sines, Tangents, Secants, &c.

′	54°			55°			56°			′
	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	
0	·8090170	1·3763819	1·7013016	·8191520	1·4281480	1·7434468	·8290376	1·4825610	1·7882916	60
1	·8091879	1·3772242	1·7019831	·8193189	1·4290326	1·7441715	·8292002	1·4834916	1·7890633	59
2	·8093588	1·3780672	1·7026653	·8194856	1·4299178	1·7448969	·8293628	1·4844231	1·7898357	58
3	·8095296	1·3789108	1·7033482	·8196523	1·4308039	1·7456230	·8295252	1·4853554	1·7906090	57
4	·8097004	1·3797551	1·7040318	·8198189	1·4316906	1·7463499	·8296877	1·4862884	1·7913831	56
5	·8098710	1·3806001	1·7047160	·8199854	1·4325781	1·7470776	·8298500	1·4872223	1·7921580	55
6	·8100416	1·3814458	1·7054010	·8201519	1·4334664	1·7478060	·8300123	1·4881570	1·7929337	54
7	·8102122	1·3822922	1·7060867	·8203183	1·4343554	1·7485352	·8301745	1·4890925	1·7937102	53
8	·8103826	1·3831392	1·7067730	·8204846	1·4352451	1·7492651	·8303366	1·4900288	1·7944876	52
9	·8105530	1·3839869	1·7074601	·8206509	1·4361356	1·7499958	·8304987	1·4909659	1·7952658	51
10	·8107234	1·3848353	1·7081478	·8208170	1·4370268	1·7507273	·8306607	1·4919039	1·7960449	50
11	·8108936	1·3856844	1·7088362	·8209832	1·4379187	1·7514595	·8308226	1·4928426	1·7968247	49
12	·8110638	1·3865342	1·7095254	·8211492	1·4388114	1·7521924	·8309845	1·4937822	1·7976054	48
13	·8112339	1·3873847	1·7102152	·8213152	1·4397049	1·7529262	·8311463	1·4947225	1·7983869	47
14	·8114040	1·3882358	1·7109058	·8214811	1·4405991	1·7536607	·8313080	1·4956637	1·7991693	46
15	·8115740	1·3890876	1·7115970	·8216469	1·4414940	1·7543959	·8314696	1·4966058	1·7999524	45
16	·8117439	1·3899401	1·7122890	·8218127	1·4423897	1·7551320	·8316312	1·4975486	1·8007365	44
17	·8119137	1·3907934	1·7129817	·8219784	1·4432862	1·7558687	·8317927	1·4984923	1·8015213	43
18	·8120835	1·3916473	1·7136750	·8221440	1·4441834	1·7566063	·8319541	1·4994367	1·8023070	42
19	·8122532	1·3925019	1·7143691	·8223096	1·4450814	1·7573446	·8321155	1·5003821	1·8030935	41
20	·8124229	1·3933571	1·7150639	·8224751	1·4459801	1·7580837	·8322768	1·5013282	1·8038809	40
21	·8125925	1·3942131	1·7157594	·8226405	1·4468796	1·7588236	·8324380	1·5022751	1·8046691	39
22	·8127620	1·3950698	1·7164556	·8228059	1·4477798	1·7595642	·8325991	1·5032229	1·8054582	38
23	·8129314	1·3959272	1·7171525	·8229712	1·4486808	1·7603057	·8327602	1·5041716	1·8062481	37
24	·8131008	1·3967852	1·7178501	·8231364	1·4495825	1·7610478	·8329212	1·5051210	1·8070388	36
25	·8132701	1·3976440	1·7185484	·8233015	1·4504850	1·7617908	·8330822	1·5060713	1·8078304	35
26	·8134393	1·3985034	1·7192475	·8234666	1·4513883	1·7625345	·8332430	1·5070224	1·8086228	34
27	·8136084	1·3993636	1·7199472	·8236316	1·4522923	1·7632791	·8334038	1·5079743	1·8094161	33
28	·8137775	1·4002245	1·7206477	·8237965	1·4531971	1·7640244	·8335646	1·5089271	1·8102102	32
29	·8139466	1·4010860	1·7213489	·8239614	1·4541027	1·7647704	·8337252	1·5098807	1·8110052	31
30	·8141155	1·4019483	1·7220508	·8241262	1·4550090	1·7655173	·8338858	1·5108352	1·8118010	30
31	·8142844	1·4028113	1·7227534	·8242909	1·4559161	1·7662649	·8340463	1·5117905	1·8125977	29
32	·8144532	1·4036749	1·7234568	·8244556	1·4568240	1·7670133	·8342068	1·5127466	1·8133953	28
33	·8146220	1·4045393	1·7241609	·8246202	1·4577326	1·7677625	·8343672	1·5137036	1·8141937	27
34	·8147906	1·4054044	1·7248657	·8247847	1·4586420	1·7685125	·8345275	1·5146614	1·8149929	26
35	·8149593	1·4062702	1·7255712	·8249491	1·4595522	1·7692633	·8346877	1·5156201	1·8157930	25
36	·8151278	1·4071367	1·7262774	·8251135	1·4604632	1·7700149	·8348479	1·5165796	1·8165940	24
37	·8152963	1·4080039	1·7269844	·8252778	1·4613749	1·7707672	·8350080	1·5175400	1·8173958	23
38	·8154647	1·4088718	1·7276921	·8254420	1·4622874	1·7715204	·8351680	1·5185012	1·8181985	22
39	·8156330	1·4097405	1·7284005	·8256062	1·4632007	1·7722743	·8353279	1·5194632	1·8190021	21
40	·8158013	1·4106098	1·7291096	·8257703	1·4641147	1·7730290	·8354878	1·5204261	1·8198065	20
41	·8159695	1·4114799	1·7298195	·8259343	1·4650296	1·7737845	·8356476	1·5213899	1·8206118	19
42	·8161376	1·4123506	1·7305301	·8260983	1·4659452	1·7745409	·8358074	1·5223545	1·8214179	18
43	·8163056	1·4132221	1·7312414	·8262622	1·4668616	1·7752980	·8359670	1·5233200	1·8222249	17
44	·8164736	1·4140943	1·7319535	·8264260	1·4677788	1·7760559	·8361266	1·5242863	1·8230328	16
45	·8166416	1·4149673	1·7326663	·8265897	1·4686967	1·7768146	·8362862	1·5252535	1·8238416	15
46	·8168094	1·4158409	1·7333798	·8267534	1·4696155	1·7775741	·8364456	1·5262215	1·8246512	14
47	·8169772	1·4167153	1·7340941	·8269170	1·4705350	1·7783344	·8366050	1·5271904	1·8254617	13
48	·8171449	1·4175904	1·7348091	·8270806	1·4714553	1·7790955	·8367643	1·5281602	1·8262731	12
49	·8173125	1·4184662	1·7355248	·8272440	1·4723764	1·7798574	·8369236	1·5291308	1·8270854	11
50	·8174801	1·4193427	1·7362413	·8274074	1·4732983	1·7806201	·8370827	1·5301023	1·8278985	10
51	·8176476	1·4202200	1·7369585	·8275708	1·4742210	1·7813836	·8372418	1·5310746	1·8287125	9
52	·8178151	1·4210979	1·7376764	·8277340	1·4751445	1·7821479	·8374009	1·5320479	1·8295274	8
53	·8179824	1·4219766	1·7383951	·8278972	1·4760688	1·7829131	·8375598	1·5330219	1·8303432	7
54	·8181497	1·4228561	1·7391145	·8280603	1·4769938	1·7836790	·8377187	1·5339969	1·8311599	6
55	·8183169	1·4237362	1·7398347	·8282234	1·4779197	1·7844457	·8378775	1·5349727	1·8319774	5
56	·8184841	1·4246171	1·7405556	·8283864	1·4788463	1·7852133	·8380363	1·5359494	1·8327959	4
57	·8186512	1·4254988	1·7412773	·8285493	1·4797738	1·7859817	·8381950	1·5369270	1·8336152	3
58	·8188182	1·4263811	1·7419997	·8287121	1·4807021	1·7867508	·8383536	1·5379054	1·8344354	2
59	·8189852	1·4272642	1·7427229	·8288749	1·4816311	1·7875208	·8385121	1·5388848	1·8352565	1
60	·8191520	1·4281480	1·7434468	·8290376	1·4825610	1·7882916	·8386706	1·5398650	1·8360785	0
′	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	′
	35°			34°			33°			

Natural Sines, Tangents, Secants, &c.

′	57°			58°			59°			′
	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	
0	·8386706	1·5398650	1·8360785	·8480481	1·6003345	1·8870799	·8571673	1·6642795	1·9416040	60
1	·8388290	1·5408460	1·8369013	·8482022	1·6013709	1·8879589	·8573171	1·6653766	1·9425445	59
2	·8389873	1·5418280	1·8377251	·8483562	1·6024082	1·8888388	·8574668	1·6664748	1·9434861	58
3	·8391455	1·5428108	1·8385498	·8485102	1·6034465	1·8897197	·8576164	1·6675741	1·9444288	57
4	·8393037	1·5437946	1·8393753	·8486641	1·6044858	1·8906016	·8577660	1·6686744	1·9453725	56
5	·8394618	1·5447792	1·8402018	·8488179	1·6055260	1·8914845	·8579155	1·6697758	1·9463173	55
6	·8396199	1·5457647	1·8410292	·8489717	1·6065672	1·8923684	·8580649	1·6708782	1·9472632	54
7	·8397778	1·5467510	1·8418574	·8491254	1·6076094	1·8932532	·8582143	1·6719818	1·9482102	53
8	·8399357	1·5477383	1·8426866	·8492790	1·6086525	1·8941391	·8583635	1·6730864	1·9491583	52
9	·8400936	1·5487264	1·8435166	·8494325	1·6096966	1·8950259	·8585127	1·6741921	1·9501075	51
10	·8402513	1·5497155	1·8443476	·8495860	1·6107417	1·8959138	·8586619	1·6752988	1·9510577	50
11	·8404090	1·5507054	1·8451795	·8497394	1·6117878	1·8968026	·8588109	1·6764067	1·9520091	49
12	·8405666	1·5516963	1·8460123	·8498927	1·6128349	1·8976924	·8589599	1·6775156	1·9529615	48
13	·8407241	1·5526880	1·8468460	·8500459	1·6138829	1·8985832	·8591088	1·6786256	1·9539150	47
14	·8408816	1·5536806	1·8476806	·8501991	1·6149320	1·8994750	·8592576	1·6797367	1·9548697	46
15	·8410390	1·5546741	1·8485161	·8503522	1·6159820	1·9003678	·8594064	1·6808489	1·9558254	45
16	·8411963	1·5556685	1·8493525	·8505053	1·6170330	1·9012616	·8595551	1·6819621	1·9567822	44
17	·8413536	1·5566639	1·8501898	·8506582	1·6180850	1·9021564	·8597037	1·6830765	1·9577402	43
18	·8415108	1·5576601	1·8510281	·8508111	1·6191380	1·9030522	·8598523	1·6841919	1·9586992	42
19	·8416679	1·5586572	1·8518672	·8509639	1·6201920	1·9039491	·8600007	1·6853085	1·9596593	41
20	·8418249	1·5596552	1·8527073	·8511167	1·6212469	1·9048469	·8601491	1·6864261	1·9606206	40
21	·8419819	1·5606542	1·8535483	·8512693	1·6223029	1·9057457	·8602975	1·6875449	1·9615829	39
22	·8421388	1·5616540	1·8543903	·8514219	1·6233599	1·9066456	·8604457	1·6886647	1·9625464	38
23	·8422956	1·5626548	1·8552331	·8515745	1·6244178	1·9075464	·8605939	1·6897856	1·9635110	37
24	·8424524	1·5636564	1·8560769	·8517269	1·6254768	1·9084483	·8607420	1·6909077	1·9644767	36
25	·8426091	1·5646590	1·8569216	·8518793	1·6265368	1·9093512	·8608901	1·6920308	1·9654435	35
26	·8427657	1·5656625	1·8577672	·8520316	1·6275977	1·9102551	·8610380	1·6931550	1·9664114	34
27	·8429222	1·5666669	1·8586138	·8521839	1·6286597	1·9111600	·8611859	1·6942804	1·9673805	33
28	·8430787	1·5676722	1·8594612	·8523360	1·6297227	1·9120659	·8613337	1·6954069	1·9683507	32
29	·8432351	1·5686784	1·8603097	·8524881	1·6307867	1·9129729	·8614815	1·6965344	1·9693220	31
30	·8433914	1·5696856	1·8611590	·8526402	1·6318517	1·9138809	·8616292	1·6976631	1·9702944	30
31	·8435477	1·5706936	1·8620093	·8527921	1·6329177	1·9147899	·8617768	1·6987929	1·9712680	29
32	·8437039	1·5717026	1·8628605	·8529440	1·6339847	1·9156999	·8619243	1·6999238	1·9722427	28
33	·8438600	1·5727126	1·8637126	·8530958	1·6350528	1·9166110	·8620717	1·7010559	1·9732185	27
34	·8440161	1·5737234	1·8645657	·8532475	1·6361218	1·9175230	·8622191	1·7021890	1·9741954	26
35	·8441720	1·5747352	1·8654197	·8533992	1·6371919	1·9184362	·8623664	1·7033233	1·9751735	25
36	·8443279	1·5757479	1·8662747	·8535508	1·6382630	1·9193503	·8625137	1·7044587	1·9761527	24
37	·8444838	1·5767615	1·8671306	·8537023	1·6393351	1·9202655	·8626608	1·7055953	1·9771331	23
38	·8446395	1·5777760	1·8679875	·8538538	1·6404082	1·9211817	·8628079	1·7067329	1·9781146	22
39	·8447952	1·5787915	1·8688453	·8540051	1·6414824	1·9220990	·8629549	1·7078717	1·9790972	21
40	·8449508	1·5798079	1·8699040	·8541564	1·6425576	1·9230173	·8631019	1·7090116	1·9800810	20
41	·8451064	1·5808253	1·8705637	·8543077	1·6436338	1·9239366	·8632488	1·7101527	1·9810659	19
42	·8452618	1·5818436	1·8714244	·8544588	1·6447111	1·9248570	·8633956	1·7112949	1·9820520	18
43	·8454172	1·5828628	1·8722859	·8546099	1·6457893	1·9257784	·8635423	1·7124382	1·9830393	17
44	·8455726	1·5838830	1·8731485	·8547609	1·6468687	1·9267009	·8636889	1·7135827	1·9840276	16
45	·8457278	1·5849041	1·8740120	·8549119	1·6479490	1·9276244	·8638355	1·7147283	1·9850172	15
46	·8458830	1·5859261	1·8748764	·8550627	1·6490304	1·9285490	·8639820	1·7158751	1·9860080	14
47	·8460381	1·5869491	1·8757419	·8552135	1·6501128	1·9294746	·8641284	1·7170230	1·9869997	13
48	·8461932	1·5879731	1·8766082	·8553643	1·6511963	1·9304013	·8642748	1·7181720	1·9879927	12
49	·8463481	1·5889979	1·8774755	·8555149	1·6522808	1·9313290	·8644211	1·7193222	1·9889869	11
50	·8465030	1·5900238	1·8783438	·8556655	1·6533663	1·9322578	·8645673	1·7204736	1·9899822	10
51	·8466579	1·5910505	1·8792131	·8558160	1·6544529	1·9331876	·8647134	1·7216261	1·9909787	9
52	·8468126	1·5920783	1·8800833	·8559664	1·6555405	1·9341185	·8648595	1·7227797	1·9919764	8
53	·8469673	1·5931070	1·8809545	·8561168	1·6566292	1·9350505	·8650055	1·7239346	1·9929752	7
54	·8471219	1·5941366	1·8818266	·8562671	1·6577189	1·9359835	·8651514	1·7250905	1·9939753	6
55	·8472765	1·5951672	1·8826998	·8564173	1·6588097	1·9369176	·8652973	1·7262477	1·9949764	5
56	·8474309	1·5961987	1·8835738	·8565674	1·6599016	1·9378527	·8654430	1·7274060	1·9959788	4
57	·8475853	1·5972312	1·8844489	·8567175	1·6609945	1·9387889	·8655887	1·7285654	1·9969823	3
58	·8477397	1·5982647	1·8853249	·8568675	1·6620884	1·9397262	·8657344	1·7297260	1·9979870	2
59	·8478939	1·5992991	1·8862019	·8570174	1·6631834	1·9406646	·8658799	1·7308878	1·9989929	1
60	·8480481	1·6003345	1·8870799	·8571673	1·6642795	1·9416040	·8660254	1·7320508	2·0000000	0
′	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	′
	32°			31°			30°			

Natural Sines, Tangents, Secants, &c.

′	60°			61°			62°			′
	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	
0	·8660254	1·7320508	2·0000000	·8746197	1·8040478	2·0626653	·8829476	1·8807265	2·1300545	60
1	·8661708	1·7332149	2·0010083	·8747607	1·8052860	2·0637484	·8830841	1·8820470	2 1312205	59
2	·8663161	1·7343803	2·0020177	·8749016	1·8065256	2·0648328	·8832206	1·8833690	2·1323880	58
3	·8664614	1·7355468	2·0030283	·8750425	1·8077664	2·0659186	·8833569	1·8846924	2·1335570	57
4	·8666066	1·7367144	2·0040402	·8751832	1·8090086	2·0670056	·8834933	1·8860172	2·1347274	56
5	·8667517	1·7378833	2·0050532	·8753239	1·8102521	2·0680940	·8836295	1·8873436	2·1358993	55
6	·8668967	1·7390533	2·0060674	·8754645	1·8114969	2·0691836	·8837656	1·8886713	2·1370726	54
7	·8670417	1·7402245	2·0070828	·8756051	1·8127430	2·0702746	·8839017	1·8900006	2·1382475	53
8	·8671866	1·7413969	2·0080994	·8757455	1·8139904	2·0713670	·8840377	1·8913313	2·1394238	52
9	·8673314	1·7425705	2·0091172	·8758859	1·8152391	2·0724606	·8841736	1·8926635	2·1406015	51
10	·8674762	1·7437453	2·0101362	·8760263	1·8164892	2·0735556	·8843095	1·8939971	2·1417808	50
11	·8676209	1·7449213	2·0111564	·8761665	1·8177405	2·0746519	·8844453	1·8953322	2·1429615	49
12	·8677655	1·7460984	2·0121779	·8763067	1·8189932	2·0757496	·8845810	1·8966688	2·1441438	48
13	·8679100	1·7472768	2·0132005	·8764468	1·8202473	2·0768486	·8847166	1·8980068	2·1453275	47
14	·8680544	1·7484564	2·0142243	·8765868	1·8215026	2·0779489	·8848522	1·8993464	2·1465127	46
15	·8681988	1·7496371	2·0152494	·8767268	1·8227593	2·0790506	·8849876	1·9006874	2·1476993	45
16	·8683431	1·7508191	2·0162756	·8768666	1·8240173	2·0801536	·8851230	1·9020299	2·1488875	44
17	·8684874	1·7520023	2·0173031	·8770064	1·8252767	2·0812580	·8852584	1·9033738	2·1500772	43
18	·8686315	1·7531866	2·0183318	·8771462	1·8265374	2·0823637	·8853936	1·9047193	2·1512684	42
19	·8687756	1·7543722	2·0193618	·8772858	1·8277994	2·0834708	·8855288	1·9060663	2·1524611	41
20	·8689196	1·7555590	2·0203929	·8774254	1·8290628	2·0845792	·8856639	1·9074147	2·1536553	40
21	·8690636	1·7567470	2·0214253	·8775649	1·8303275	2·0856890	·8857989	1·9087647	2·1548510	39
22	·8692074	1·7579362	2·0224589	·8777043	1·8315936	2·0868002	·8859339	1·9101162	2·1560482	38
23	·8693512	1·7591267	2·0234937	·8778437	1·8328610	2·0879127	·8860688	1·9114691	2·1572469	37
24	·8694949	1·7603183	2·0245297	·8779830	1·8341297	2·0890265	·8862036	1·9128236	2·1584471	36
25	·8696386	1·7615112	2·0255670	·8781222	1·8353999	2·0901418	·8863383	1·9141795	2·1596489	35
26	·8697821	1·7627053	2·0266056	·8782613	1·8366713	2·0912584	·8864730	1·9155370	2·1608522	34
27	·8699256	1·7639007	2·0276453	·8784004	1·8379442	2·0923764	·8866075	1·9168960	2·1620570	33
28	·8700691	1·7650972	2·0286863	·8785394	1·8392184	2·0934957	·8867420	1·9182565	2·1632633	32
29	·8702124	1·7662950	2·0297286	·8786783	1·8404940	2·0946164	·8868765	1·9196186	2·1644712	31
30	·8703557	1·7674940	2·0307720	·8788171	1·8417709	2·0957385	·8870108	1·9209821	2·1656806	30
31	·8704989	1·7686943	2·0318168	·8789559	1·8430492	2·0968620	·8871451	1·9223472	2·1668915	29
32	·8706420	1·7698958	2·0328628	·8790946	1·8443289	2·0979869	·8872793	1·9237138	2·1681040	28
33	·8707851	1·7710985	2·0339100	·8792332	1·8456099	2·0991131	·8874134	1·9250819	2·1693180	27
34	·8709281	1·7723024	2·0349585	·8793717	1·8468923	2·1002408	·8875475	1·9264516	2·1705335	26
35	·8710710	1·7735076	2·0360082	·8795102	1·8481761	2·1013698	·8876815	1·9278228	2·1717506	25
36	·8712138	1·7747141	2·0370592	·8796486	1·8494613	2·1025002	·8878154	1·9291956	2·1729693	24
37	·8713566	1·7759218	2·0381114	·8797869	1·8507479	2·1036320	·8879492	1·9305699	2·1741895	23
38	·8714993	1·7771307	2·0391649	·8799251	1·8520358	2·1047652	·8880830	1·9319457	2·1754113	22
39	·8716419	1·7783409	2·0402197	·8800633	1·8533252	2·1058998	·8882166	1·9333231	2·1766346	21
40	·8717844	1·7795524	2·0412757	·8802014	1·8546159	2·1070359	·8883503	1·9347020	2·1778595	20
41	·8719269	1·7807651	2·0423330	·8803394	1·8559080	2·1081733	·8884838	1·9360825	2·1790859	19
42	·8720693	1·7819790	2·0433916	·8804774	1·8572015	2·1093121	·8886172	1·9374645	2·1803139	18
43	·8722116	1·7831943	2·0444515	·8806152	1·8584965	2·1104523	·8887506	1·9388481	2·1815435	17
44	·8723538	1·7844107	2·0455126	·8807530	1·8597928	2·1115940	·8888839	1·9402333	2·1827746	16
45	·8724960	1·7856285	2·0465750	·8808907	1·8610905	2·1127371	·8890171	1·9416200	2·1840074	15
46	·8726381	1·7868475	2·0476386	·8810284	1·8623896	2·1138815	·8891503	1·9430083	2·1852417	14
47	·8727801	1·7880678	2·0487036	·8811660	1·8636902	2·1150274	·8892834	1·9443981	2·1864775	13
48	·8729221	1·7892893	2·0497698	·8813035	1·8649921	2·1161748	·8894164	1·9457896	2·1877150	12
49	·8730640	1·7905121	2·0508373	·8814409	1·8662955	2·1173235	·8895493	1·9471826	2·1889541	11
50	·8732058	1·7917362	2·0519061	·8815782	1·8676003	2·1184737	·8896822	1·9485772	2·1901947	10
51	·8733475	1·7929616	2·0529762	·8817155	1·8689065	2·1196253	·8898149	1·9499733	2·1914370	9
52	·8734891	1·7941883	2·0540476	·8818527	1·8702141	2·1207783	·8899476	1·9513711	2·1926808	8
53	·8736307	1·7954162	2·0551203	·8819898	1·8715231	2·1219328	·8900803	1·9527704	2·1939262	7
54	·8737722	1·7966454	2·0561942	·8821269	1·8728336	2·1230887	·8902128	1·9541713	2·1951733	6
55	·8739137	1·7978759	2·0572695	·8822638	1·8741455	2·1242460	·8903453	1·9555739	2·1964219	5
56	·8740550	1·7991077	2·0583460	·8824007	1·8754588	2·1254048	·8904777	1·9569780	2·1976721	4
57	·8741963	1·8003408	2·0594239	·8825376	1·8767736	2·1265651	·8906100	1·9583837	2·1989240	3
58	·8743375	1·8015751	2·0605031	·8826743	1·8780898	2·1277267	·8907423	1·9597910	2·2001775	2
59	·8744786	1·8028108	2·0615836	·8828110	1·8794074	2·1288899	·8908744	1·9612000	2·2014326	1
60	·8746197	1·8040478	2·0626653	·8829476	1·8807265	2·1300545	·8910065	1·9626105	2·2026893	0
′	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	′
	29°			28°			27°			

Natural Sines, Tangents, Secants, &c.

′	63°			64°			65°			′
	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	
0	·8910065	1·9626105	2·2026893	·8987940	2·0503038	2·2811720	·9063078	2·1445069	2·3662016	60
1	·8911385	1·9640227	2·2039476	·8989215	2·0518185	2·2825335	·9064307	2·1461366	2·3676787	59
2	·8912705	1·9654364	2·2052075	·8990489	2·0533349	2·2838967	·9065535	2·1477683	2·3691578	58
3	·8914024	1·9668518	2·2064691	·8991763	2·0548531	2·2852618	·9066762	2·1494021	2·3706390	57
4	·8915342	1·9682688	2·2077323	·8993035	2·0563732	2·2866286	·9067989	2·1510378	2·3721222	56
5	·8916659	1·9696874	2·2089972	·8994307	2·0578950	2·2879974	·9069215	2·1526757	2·3736075	55
6	·8917975	1·9711077	2·2102637	·8995578	2·0594187	2·2893679	·9070440	2·1543156	2·3750949	54
7	·8919291	1·9725296	2·2115318	·8996848	2·0609442	2·2907403	·9071665	2·1559575	2·3765843	53
8	·8920606	1·9739531	2·2128016	·8998117	2·0624716	2·2921145	·9072888	2·1576015	2·3780758	52
9	·8921920	1·9753782	2·2140730	·8999386	2·0640008	2·2934906	·9074111	2·1592476	2·3795694	51
10	·8923234	1·9768050	2·2153460	·9000654	2·0655318	2·2948685	·9075333	2·1608958	2·3810650	50
11	·8924546	1·9782334	2·2166208	·9001921	2·0670646	2·2962483	·9076554	2·1625460	2·3825627	49
12	·8925858	1·9796635	2·2178971	·9003188	2·0685994	2·2976299	·9077775	2·1641983	2·3840625	48
13	·8927169	1·9810952	2·2191752	·9004453	2·0701359	2·2990134	·9078995	2·1658527	2·3855645	47
14	·8928480	1·9825286	2·2204548	·9005718	2·0716743	2·3003988	·9080214	2·1675091	2·3870685	46
15	·8929789	1·9839636	2·2217362	·9006982	2·0732146	2·3017860	·9081432	2·1691677	2·3885746	45
16	·8931098	1·9854003	2·2230192	·9008246	2·0747567	2·3031751	·9082649	2·1708283	2·3900828	44
17	·8932406	1·9868387	2·2243039	·9009508	2·0763007	2·3045660	·9083866	2·1724911	2·3915931	43
18	·8933714	1·9882787	2·2255903	·9010770	2·0778465	2·3059588	·9085082	2·1741559	2·3931055	42
19	·8935021	1·9897204	2·2268783	·9012031	2·0793942	2·3073536	·9086297	2·1758229	2·3946201	41
20	·8936326	1·9911637	2·2281681	·9013292	2·0809438	2·3087501	·9087511	2·1774920	2·3961367	40
21	·8937632	1·9926087	2·2294595	·9014551	2·0824953	2·3101486	·9088725	2·1791631	2·3976555	39
22	·8938936	1·9940554	2·2307526	·9015810	2·0840487	2·3115490	·9089938	2·1808364	2·3991764	38
23	·8940240	1·9955038	2·2320474	·9017068	2·0856039	2·3129513	·9091150	2·1825119	2·4006995	37
24	·8941542	1·9969539	2·2333438	·9018325	2·0871610	2·3143554	·9092361	2·1841894	2·4022247	36
25	·8942844	1·9984056	2·2346420	·9019582	2·0887200	2·3157615	·9093572	2·1858691	2·4037520	35
26	·8944146	1·9998590	2·2359419	·9020838	2·0902809	2·3171695	·9094781	2·1875510	2·4052815	34
27	·8945446	2·0013142	2·2372435	·9022092	2·0918437	2·3185794	·9095990	2·1892349	2·4068132	33
28	·8946746	2·0027710	2·2385468	·9023347	2·0934085	2·3199912	·9097199	2·1909210	2·4083469	32
29	·8948045	2·0042295	2·2398517	·9024600	2·0949751	2·3214049	·9098406	2·1926093	2·4098829	31
30	·8949344	2·0056897	2·2411585	·9025853	2·0965436	2·3228205	·9099613	2·1942997	2·4114210	30
31	·8950641	2·0071516	2·2424669	·9027105	2·0981140	2·3242381	·9100819	2·1959923	2·4129613	29
32	·8951938	2·0086153	2·2437770	·9028356	2·0996864	2·3256575	·9102024	2·1976871	2·4145038	28
33	·8953234	2·0100806	2·2450889	·9029606	2·1012607	2·3270790	·9103228	2·1993840	2·4160484	27
34	·8954529	2·0115477	2·2464025	·9030856	2·1028369	2·3285023	·9104432	2·2010831	2·4175952	26
35	·8955824	2·0130164	2·2477178	·9032105	2·1044150	2·3299276	·9105635	2·2027843	2·4191442	25
36	·8957118	2·0144869	2·2490348	·9033353	2·1059951	2·3313548	·9106837	2·2044878	2·4206954	24
37	·8958411	2·0159592	2·2503536	·9034600	2·1075771	2·3327840	·9108038	2·2061934	2·4222488	23
38	·8959703	2·0174331	2·2516741	·9035847	2·1091611	2·3342152	·9109238	2·2079012	2·4238044	22
39	·8960994	2·0189088	2·2529964	·9037093	2·1107470	2·3356482	·9110438	2·2096112	2·4253622	21
40	·8962285	2·0203862	2·2543204	·9038338	2·1123348	2·3370833	·9111637	2·2113234	2·4269222	20
41	·8963575	2·0218654	2·2556461	·9039582	2·1139246	2·3385203	·9112835	2·2130379	2·4284844	19
42	·8964864	2·0233462	2·2569736	·9040825	2·1155164	2·3399593	·9114033	2·2147545	2·4300489	18
43	·8966153	2·0248289	2·2583029	·9042068	2·1171101	2·3414002	·9115229	2·2164733	2·4316155	17
44	·8967440	2·0263133	2·2596339	·9043310	2·1187057	2·3428432	·9116425	2·2181944	2·4331844	16
45	·8968727	2·0277994	2·2609667	·9044551	2·1203034	2·3442881	·9117620	2·2199177	2·4347555	15
46	·8970014	2·0292873	2·2623012	·9045792	2·1219030	2·3457349	·9118815	2·2216432	2·4363289	14
47	·8971299	2·0307769	2·2636376	·9047032	2·1235046	2·3471838	·9120008	2·2233709	2·4379045	13
48	·8972584	2·0322683	2·2649756	·9048271	2·1251082	2·3486347	·9121201	2·2251009	2·4394823	12
49	·8973868	2·0337615	2·2663155	·9049509	2·1267137	2·3500875	·9122393	2·2268331	2·4410624	11
50	·8975151	2·0352565	2·2676571	·9050746	2·1283213	2·3515424	·9123584	2·2285676	2·4426448	10
51	·8976433	2·0367532	2·2690005	·9051983	2·1299308	2·3529992	·9124775	2·2303043	2·4442294	9
52	·8977715	2·0382517	2·2703457	·9053219	2·1315423	2·3544581	·9125965	2·2320433	2·4458163	8
53	·8978996	2·0397519	2·2716927	·9054454	2·1331559	2·3559189	·9127154	2·2337845	2·4474054	7
54	·8980276	2·0412540	2·2730415	·9055688	2·1347714	2·3573818	·9128342	2·2355280	2·4489968	6
55	·8981555	2·0427578	2·2743921	·9056922	2·1363890	2·3588467	·9129529	2·2372738	2·4505905	5
56	·8982834	2·0442634	2·2757445	·9058154	2·1380085	2·3603136	·9130716	2·2390218	2·4521865	4
57	·8984112	2·0457708	2·2770987	·9059386	2·1396301	2·3617826	·9131902	2·2407721	2·4537848	3
58	·8985389	2·0472800	2·2784546	·9060618	2·1412537	2·3632535	·9133087	2·2425247	2·4553853	2
59	·8986665	2·0487910	2·2798124	·9061848	2·1428793	2·3647265	·9134271	2·2442796	2·4569882	1
60	·8987940	2·0503038	2·2811720	·9063078	2·1445069	2·3662016	·9135455	2·2460368	2·4585933	0
′	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	′
	26°			25°			24°			

Natural Sines, Tangents, Secants, &c.

′	66°			67°			68°			′
	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	
0	·9135455	2·2460368	2·4585933	·9205049	2·3558524	2·5593047	·9271839	2·4750869	2·6694672	60
1	·9136637	2·2477962	2·4602008	·9206185	2·3577590	2·5610599	·9272928	2·4771612	2·6713906	59
2	·9137819	2·2495580	2·4618106	·9207320	2·3596683	2·5628176	·9274016	2·4792386	2·6733171	58
3	·9139001	2·2513221	2·4634227	·9208455	2·3615801	2·5645781	·9275104	2·4813190	2·6752465	57
4	·9140181	2·2530885	2·4650371	·9209589	2·3634946	2·5663412	·9276191	2·4834023	2·6771790	56
5	·9141361	2·2548572	2·4666538	·9210722	2·3654118	2·5681069	·9277277	2·4854887	2·6791145	55
6	·9142540	2·2566283	2·4682729	·9211854	2·3673316	2·5698752	·9278363	2·4875781	2·6810530	54
7	·9143718	2·2584016	2·4698943	·9212986	2·3692540	2·5716462	·9279447	2·4896706	2·6829945	53
8	·9144895	2·2601773	2·4715181	·9214116	2·3711791	2·5734199	·9280531	2·4917660	2·6849391	52
9	·9146072	2·2619554	2·4731442	·9215246	2·3731068	2·5751963	·9281614	2·4938645	2·6868867	51
10	·9147247	2·2637357	2·4747726	·9216375	2·3750372	2·5769753	·9282696	2·4959661	2·6888374	50
11	·9148422	2·2655184	2·4764034	·9217504	2·3769703	2·5787570	·9283778	2·4980707	2·6907912	49
12	·9149597	2·2673035	2·4780366	·9218632	2·3789060	2·5805414	·9284858	2·5001784	2·6927480	48
13	·9150770	2·2690909	2·4796721	·9219758	2·3808444	2·5823284	·9285938	2·5022891	2·6947079	47
14	·9151943	2·2708807	2·4813100	·9220884	2·3827855	2·5841182	·9287017	2·5044029	2·6966709	46
15	·9153115	2·2726729	2·4829503	·9222010	2·3847293	2·5859107	·9288096	2·5065198	2·6986370	45
16	·9154286	2·2744674	2·4845929	·9223134	2·3866758	2·5877058	·9289173	2·5086398	2·7006061	44
17	·9155456	2·2762643	2·4862380	·9224258	2·3886250	2·5895037	·9290250	2·5107629	2·7025784	43
18	·9156626	2·2780636	2·4878854	·9225381	2·3905769	2·5913043	·9291326	2·5128890	2·7045538	42
19	·9157795	2·2798653	2·4895352	·9226503	2·3925316	2·5931077	·9292401	2·5150183	2·7065323	41
20	·9158963	2·2816693	2·4911874	·9227624	2·3944889	2·5949137	·9293475	2·5171507	2·7085139	40
21	·9160130	2·2834758	2·4928421	·9228745	2·3964490	2·5967225	·9294549	2·5192863	2·7104987	39
22	·9161297	2·2852846	2·4944991	·9229865	2·3984118	2·5985341	·9295622	2·5214249	2·7124866	38
23	·9162462	2·2870959	2·4961586	·9230984	2·4003774	2·6003484	·9296694	2·5235667	2·7144777	37
24	·9163627	2·2889096	2·4978204	·9232102	2·4023457	2·6021654	·9297765	2·5257117	2·7164719	36
25	·9164791	2·2907257	2·4994848	·9233220	2·4043168	2·6039852	·9298835	2·5278598	2·7184693	35
26	·9165955	2·2925442	2·5011515	·9234336	2·4062906	2·6058078	·9299905	2·5300111	2·7204698	34
27	·9167118	2·2943651	2·5028207	·9235452	2·4082672	2·6076332	·9300974	2·5321655	2·7224735	33
28	·9168279	2·2961885	2·5044923	·9236567	2·4102465	2·6094613	·9302042	2·5343231	2·7244804	32
29	·9169440	2·2980143	2·5061663	·9237682	2·4122286	2·6112922	·9303109	2·5364839	2·7264905	31
30	·9170601	2·2998425	2·5078428	·9238795	2·4142136	2·6131259	·9304176	2·5386479	2·7285038	30
31	·9171760	2·3016732	2·5095218	·9239908	2·4162013	2·6149624	·9305241	2·5408151	2·7305203	29
32	·9172919	2·3035064	2·5112032	·9241020	2·4181918	2·6168018	·9306306	2·5429855	2·7325400	28
33	·9174077	2·3053420	2·5128871	·9242131	2·4201851	2·6186439	·9307370	2·5451591	2·7345630	27
34	·9175234	2·3071801	2·5145735	·9243242	2·4221812	2·6204888	·9308434	2·5473359	2·7365892	26
35	·9176391	2·3090206	2·5162624	·9244351	2·4241801	2·6223366	·9309496	2·5495160	2·7386186	25
36	·9177546	2·3108637	2·5179537	·9245460	2·4261819	2·6241872	·9310558	2·5516992	2·7406512	24
37	·9178701	2·3127092	2·5196475	·9246568	2·4281864	2·6260406	·9311619	2·5538858	2·7426871	23
38	·9179855	2·3145571	2·5213438	·9247676	2·4301938	2·6278969	·9312679	2·5560756	2·7447263	22
39	·9181009	2·3164076	2·5230426	·9248782	2·4322041	2·6297560	·9313739	2·5582686	2·7467687	21
40	·9182161	2·3182606	2·5247440	·9249888	2·4342172	2·6316180	·9314797	2·5604649	2·7488144	20
41	·9183313	2·3201160	2·5264478	·9250993	2·4362331	2·6334828	·9315855	2·5626645	2·7508634	19
42	·9184464	2·3219740	2·5281541	·9252097	2·4382519	2·6353506	·9316912	2·5648674	2·7529157	18
43	·9185614	2·3238345	2·5298630	·9253201	2·4402736	2·6372211	·9317969	2·5670735	2·7549712	17
44	·9186763	2·3256975	2·5315744	·9254303	2·4422982	2·6390946	·9319024	2·5692830	2·7570301	16
45	·9187912	2·3275630	2·5332883	·9255405	2·4443256	2·6409710	·9320079	2·5714957	2·7590923	15
46	·9189060	2·3294311	2·5350048	·9256506	2·4463559	2·6428502	·9321133	2·5737118	2·7611578	14
47	·9190207	2·3313017	2·5367238	·9257606	2·4483891	2·6447323	·9322186	2·5759312	2·7632267	13
48	·9191353	2·3331748	2·5384453	·9258706	2·4504252	2·6466174	·9323238	2·5781539	2·7652988	12
49	·9192499	2·3350505	2·5401694	·9259805	2·4524642	2·6485054	·9324290	2·5803800	2·7673744	11
50	·9193644	2·3369287	2·5418961	·9260902	2·4545061	2·6503962	·9325340	2·5826094	2·7694532	10
51	·9194788	2·3388095	2·5436253	·9262000	2·4565510	2·6522901	·9326390	2·5848421	2·7715355	9
52	·9195931	2·3406928	2·5453571	·9263096	2·4585987	2·6541868	·9327439	2·5870782	2·7736211	8
53	·9197073	2·3425787	2·5470915	·9264192	2·4606494	2·6560865	·9328488	2·5893177	2·7757100	7
54	·9198215	2·3444672	2·5488284	·9265286	2·4627030	2·6579891	·9329535	2·5915606	2·7778024	6
55	·9199356	2·3463582	2·5505680	·9266380	2·4647596	2·6598947	·9330582	2·5938068	2·7798982	5
56	·9200496	2·3482519	2·5523101	·9267474	2·4668191	2·6618033	·9331628	2·5960564	2·7819973	4
57	·9201635	2·3501481	2·5540548	·9268566	2·4688816	2·6637148	·9332673	2·5983095	2·7840999	3
58	·9202774	2·3520469	2·5558022	·9269658	2·4709470	2·6656292	·9333718	2·6005659	2·7862059	2
59	·9203912	2·3539483	2·5575521	·9270748	2·4730155	2·6675467	·9334761	2·6028258	2·7883153	1
60	·9205049	2·3558524	2·5593047	·9271839	2·4750869	2·6694672	·9335804	2·6050891	2·7904281	0
′	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	′
	23°			22°			21°			

Natural Sines, Tangents, Secants, &c.

′	69° Sines.	69° Tangents.	69° Secants.	70° Sines.	70° Tangents.	70° Secants.	71° Sines.	71° Tangents.	71° Secants.	′
0	·9335804	2·6050891	2·7904281	·9396926	2·7474774	2·9238044	·9455186	2·9042109	3·0715535	60
1	·9336846	2·6073558	2·7925444	·9397921	2·7499661	2·9261431	·9456132	2·9069576	3·0741507	59
2	·9337888	2·6096259	2·7946641	·9398914	2·7524588	2·9284858	·9457078	2·9097089	3·0767525	58
3	·9338928	2·6118995	2·7967873	·9399907	2·7549554	2·9308326	·9458023	2·9124649	3·0793590	57
4	·9339968	2·6141766	2·7989140	·9400899	2·7574561	2·9331833	·9458968	2·9152256	3·0819702	56
5	·9341007	2·6164571	2·8010441	·9401891	2·7599608	2·9355380	·9459911	2·9179909	3·0845860	55
6	·9342045	2·6187411	2·8031777	·9402881	2·7624695	2·9378968	·9460854	2·9207610	3·0872066	54
7	·9343082	2·6210286	2·8053148	·9403871	2·7649822	2·9402597	·9461795	2·9235358	3·0898319	53
8	·9344119	2·6233196	2·8074554	·9404860	2·7674990	2·9426265	·9462736	2·9263152	3·0924620	52
9	·9345154	2·6256141	2·8095995	·9405848	2·7700199	2·9449975	·9463677	2·9290995	3·0950967	51
10	·9346189	2·6279121	2·8117471	·9406835	2·7725448	2·9473725	·9464616	2·9318885	3·0977363	50
11	·9347223	2·6302136	2·8138982	·9407822	2·7750738	2·9497516	·9465555	2·9346822	3·1003805	49
12	·9348257	2·6325186	2·8160529	·9408808	2·7776069	2·9521348	·9466493	2·9374807	3·1030296	48
13	·9349289	2·6348271	2·8182111	·9409793	2·7801440	2·9545221	·9467430	2·9402840	3·1056835	47
14	·9350321	2·6371392	2·8203729	·9410777	2·7826853	2·9569135	·9468366	2·9430921	3·1083422	46
15	·9351352	2·6394549	2·8225382	·9411760	2·7852307	2·9593090	·9469301	2·9459050	3·1110057	45
16	·9352382	2·6417741	2·8247071	·9412743	2·7877802	2·9617087	·9470236	2·9487227	3·1136740	44
17	·9353412	2·6440969	2·8268796	·9413724	2·7903339	2·9641125	·9471170	2·9515453	3·1163472	43
18	·9354440	2·6464232	2·8290556	·9414705	2·7928917	2·9665205	·9472103	2·9543727	3·1190252	42
19	·9355468	2·6487531	2·8312353	·9415686	2·7954537	2·9689327	·9473035	2·9572050	3·1217081	41
20	·9356495	2·6510867	2·8334185	·9416665	2·7980198	2·9713490	·9473966	2·9600422	3·1243959	40
21	·9357521	2·6534238	2·8356054	·9417644	2·8005901	2·9737695	·9474897	2·9628842	3·1270886	39
22	·9358547	2·6557645	2·8377958	·9418621	2·8031646	2·9761942	·9475827	2·9657312	3·1297862	38
23	·9359571	2·6581089	2·8399899	·9419598	2·8057433	2·9786231	·9476756	2·9685831	3·1324887	37
24	·9360595	2·6604569	2·8421877	·9420575	2·8083263	2·9810563	·9477684	2·9714399	3·1351962	36
25	·9361618	2·6628085	2·8443891	·9421550	2·8109134	2·9834936	·9478612	2·9743016	3·1379086	35
26	·9362641	2·6651638	2·8465941	·9422525	2·8135048	2·9859352	·9479538	2·9771683	3·1406259	34
27	·9363662	2·6675227	2·8488028	·9423498	2·8161004	2·9883811	·9480464	2·9800400	3·1433483	33
28	·9364683	2·6698853	2·8510152	·9424471	2·8187003	2·9908312	·9481389	2·9829167	3·1460756	32
29	·9365703	2·6722516	2·8532312	·9425444	2·8213045	2·9932856	·9482313	2·9857983	3·1488079	31
30	·9366722	2·6746215	2·8554510	·9426415	2·8239129	2·9957443	·9483237	2·9886850	3·1515453	30
31	·9367740	2·6769951	2·8576744	·9427386	2·8265256	2·9982073	·9484159	2·9915766	3·1542877	29
32	·9368758	2·6793725	2·8599015	·9428355	2·8291426	3·0006746	·9485081	2·9944734	3·1570351	28
33	·9369774	2·6817535	2·8621324	·9429324	2·8317639	3·0031462	·9486002	2·9973751	3·1597876	27
34	·9370790	2·6841383	2·8643670	·9430293	2·8343896	3·0056221	·9486922	3·0002820	3·1625452	26
35	·9371806	2·6865267	2·8666053	·9431260	2·8370196	3·0081024	·9487842	3·0031939	3·1653078	25
36	·9372820	2·6889190	2·8688474	·9432227	2·8396539	3·0105870	·9488760	3·0061109	3·1680756	24
37	·9373833	2·6913149	2·8710932	·9433192	2·8422926	3·0130760	·9489678	3·0090330	3·1708484	23
38	·9374846	2·6937147	2·8733428	·9434157	2·8449356	3·0155694	·9490595	3·0119603	3·1736264	22
39	·9375858	2·6961181	2·8755961	·9435122	2·8475831	3·0180672	·9491511	3·0148926	3·1764095	21
40	·9376869	2·6985254	2·8778532	·9436085	2·8502349	3·0205693	·9492426	3·0178301	3·1791978	20
41	·9377880	2·7009364	2·8801142	·9437048	2·8528911	3·0230759	·9493341	3·0207728	3·1819913	19
42	·9378889	2·7033513	2·8823789	·9438010	2·8555517	3·0255868	·9494255	3·0237207	3·1847899	18
43	·9379898	2·7057699	2·8846474	·9438971	2·8582168	3·0281023	·9495168	3·0266737	3·1875937	17
44	·9380906	2·7081923	2·8869198	·9439931	2·8608863	3·0306221	·9496080	3·0296320	3·1904028	16
45	·9381913	2·7106186	2·8891960	·9440890	2·8635602	3·0331464	·9496991	3·0325954	3·1932170	15
46	·9382920	2·7130487	2·8914760	·9441849	2·8662386	3·0356752	·9497902	3·0355641	3·1960365	14
47	·9383925	2·7154826	2·8937598	·9442807	2·8689215	3·0382084	·9498812	3·0385381	3·1988613	13
48	·9384930	2·7179204	2·8960475	·9443764	2·8716088	3·0407462	·9499721	3·0415173	3·2016913	12
49	·9385934	2·7203620	2·8983391	·9444720	2·8743007	3·0432884	·9500629	3·0445018	3·2045266	11
50	·9386938	2·7228076	2·9006346	·9445675	2·8769970	3·0458352	·9501536	3·0474915	3·2073673	10
51	·9387940	2·7252569	2·9029339	·9446630	2·8796979	3·0483864	·9502443	3·0504866	3·2102132	9
52	·9388942	2·7277102	2·9052372	·9447584	2·8824033	3·0509423	·9503348	3·0534870	3·2130644	8
53	·9389942	2·7301674	2·9075443	·9448537	2·8851132	3·0535026	·9504253	3·0564928	3·2159210	7
54	·9390943	2·7326284	2·9098553	·9449489	2·8878277	3·0560675	·9505157	3·0595038	3·2187830	6
55	·9391942	2·7350934	2·9121703	·9450441	2·8905467	3·0586370	·9506061	3·0625203	3·2216503	5
56	·9392940	2·7375623	2·9144892	·9451391	2·8932704	3·0612111	·9506963	3·0655421	3·2245230	4
57	·9393938	2·7400352	2·9168121	·9452341	2·8959986	3·0637898	·9507865	3·0685694	3·2274011	3
58	·9394935	2·7425120	2·9191389	·9453290	2·8987314	3·0663731	·9508766	3·0716020	3·2302846	2
59	·9395931	2·7449927	2·9214697	·9454238	2·9014688	3·0689610	·9509666	3·0746400	3·2331736	1
60	·9396926	2·7474774	2·9238044	·9455186	2·9042109	3·0715535	·9510565	3·0776835	3·2360680	0
′	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	′
	20°			19°			18°			

Natural Sines, Tangents, Secants, &c.

′	72°			73°			74°			′
	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	
0	·9510565	3·0776835	3·2360680	·9563048	3·2708526	3·4203036	·9612617	3·4874144	3·6279553	60
1	·9511464	3·0807325	3·2389678	·9563898	3·2742588	3·4235611	·9613418	3·4912470	3·6316395	59
2	·9512361	3·0837869	3·2418732	·9564747	3·2776715	3·4268251	·9614219	3·4950874	3·6353316	58
3	·9513258	3·0868468	3·2447840	·9565595	3·2810907	3·4300956	·9615019	3·4989356	3·6390315	57
4	·9514154	3·0899122	3·2477003	·9566443	3·2845164	3·4333727	·9615818	3·5027916	3·6427392	56
5	·9515050	3·0929831	3·2506222	·9567290	3·2879487	3·4366563	·9616616	3·5066555	3·6464548	55
6	·9515944	3·0960596	3·2535496	·9568136	3·2913876	3·4399465	·9617413	3·5105273	3·6501783	54
7	·9516838	3·0991416	3·2564825	·9568981	3·2948330	3·4432433	·9618210	3·5144070	3·6539097	53
8	·9517731	3·1022291	3·2594211	·9569825	3·2982851	3·4465467	·9619005	3·5182946	3·6576491	52
9	·9518623	3·1053223	3·2623652	·9570669	3·3017438	3·4498568	·9619800	3·5221902	3·6613964	51
10	·9519514	3·1084210	3·2653149	·9571512	3·3052091	3·4531735	·9620594	3·5260938	3·6651518	50
11	·9520404	3·1115254	3·2682702	·9572354	3·3086811	3·4564969	·9621387	3·5300054	3·6689151	49
12	·9521294	3·1146353	3·2712311	·9573195	3·3121598	3·4598269	·9622180	3·5339251	3·6726865	48
13	·9522183	3·1177509	3·2741977	·9574035	3·3156452	3·4631637	·9622972	3·5378528	3·6764660	47
14	·9523071	3·1208722	3·2771700	·9574875	3·3191373	3·4665073	·9623762	3·5417886	3·6802536	46
15	·9523958	3·1239991	3·2801479	·9575714	3·3226362	3·4698576	·9624552	3·5457325	3·6840493	45
16	·9524844	3·1271317	3·2831316	·9576552	3·3261419	3·4732146	·9625342	3·5496846	3·6878532	44
17	·9525730	3·1302701	3·2861209	·9577389	3·3296543	3·4765785	·9626130	3·5536449	3·6916652	43
18	·9526615	3·1334141	3·2891160	·9578225	3·3331736	3·4799492	·9626917	3·5576133	3·6954854	42
19	·9527499	3·1365639	3·2921168	·9579060	3·3366997	3·4833267	·9627704	3·5615900	3·6993139	41
20	·9528382	3·1397194	3·2951234	·9579895	3·3402326	3·4867110	·9628490	3·5655749	3·7031506	40
21	·9529264	3·1428807	3·2981357	·9580729	3·3437724	3·4901023	·9629275	3·5695681	3·7069956	39
22	·9530146	3·1460478	3·3011539	·9581562	3·3473191	3·4935004	·9630060	3·5735696	3·7108489	38
23	·9531027	3·1492207	3·3041778	·9582394	3·3508728	3·4969055	·9630843	3·5775794	3·7147105	37
24	·9531907	3·1523994	3·3072076	·9583226	3·3544333	3·5003175	·9631626	3·5815975	3·7185805	36
25	·9532786	3·1555840	3·3102432	·9584056	3·3580008	3·5037365	·9632408	3·5856241	3·7224589	35
26	·9533664	3·1587744	3·3132847	·9584886	3·3615753	3·5071625	·9633189	3·5896590	3·7263457	34
27	·9534542	3·1619706	3·3163320	·9585715	3·3651568	3·5105954	·9633969	3·5937024	3·7302409	33
28	·9535418	3·1651728	3·3193853	·9586543	3·3687453	3·5140354	·9634748	3·5977543	3·7341446	32
29	·9536294	3·1683808	3·3224444	·9587371	3·3723408	3·5174824	·9635527	3·6018146	3·7380568	31
30	·9537170	3·1715948	3·3255095	·9588197	3·3759434	3·5209365	·9636305	3·6058835	3·7419775	30
31	·9538044	3·1748147	3·3285805	·9589023	3·3795531	3·5243977	·9637081	3·6099609	3·7459068	29
32	·9538917	3·1780406	3·3316575	·9589848	3·3831699	3·5278660	·9637858	3·6140469	3·7498447	28
33	·9539790	3·1812724	3·3347405	·9590672	3·3867938	3·5313414	·9638633	3·6181415	3·7537911	27
34	·9540662	3·1845102	3·3378294	·9591496	3·3904249	3·5348240	·9639407	3·6222447	3·7577462	26
35	·9541533	3·1877540	3·3409244	·9592318	3·3940631	3·5383138	·9640181	3·6263566	3·7617100	25
36	·9542403	3·1910039	3·3440254	·9593140	3·3977085	3·5418107	·9640954	3·6304771	3·7656824	24
37	·9543273	3·1942598	3·3471324	·9593961	3·4013612	3·5453149	·9641726	3·6346064	3·7696636	23
38	·9544141	3·1975217	3·3502455	·9594781	3·4050210	3·5488263	·9642497	3·6387444	3·7736535	22
39	·9545009	3·2007897	3·3533647	·9595600	3·4086882	3·5523450	·9643268	3·6428911	3·7776522	21
40	·9545876	3·2040638	3·3564900	·9596418	3·4123626	3·5558710	·9644037	3·6470467	3·7816596	20
41	·9546743	3·2073440	3·3596214	·9597236	3·4160443	3·5594042	·9644806	3·6512111	3·7856760	19
42	·9547608	3·2106304	3·3627589	·9598053	3·4197333	3·5629448	·9645574	3·6553844	3·7897011	18
43	·9548473	3·2139228	3·3659026	·9598869	3·4234297	3·5664928	·9646341	3·6595665	3·7937352	17
44	·9549336	3·2172215	3·3690524	·9599684	3·4271334	3·5700481	·9647108	3·6637575	3·7977782	16
45	·9550199	3·2205263	3·3722084	·9600499	3·4308446	3·5736108	·9647873	3·6679575	3·8018301	15
46	·9551062	3·2238373	3·3753707	·9601312	3·4345631	3·5771810	·9648638	3·6721665	3·8058911	14
47	·9551923	3·2271546	3·3785391	·9602125	3·4382891	3·5807586	·9649402	3·6763845	3·8099610	13
48	·9552784	3·2304780	3·3817138	·9602937	3·4420226	3·5843437	·9650165	3·6806115	3·8140399	12
49	·9553643	3·2338078	3·3848948	·9603748	3·4457635	3·5879362	·9650927	3·6848475	3·8181280	11
50	·9554502	3·2371438	3·3880820	·9604558	3·4495120	3·5915363	·9651689	3·6890927	3·8222251	10
51	·9555361	3·2404860	3·3912755	·9605368	3·4532679	3·5951439	·9652449	3·6933469	3·8263313	9
52	·9556218	3·2438346	3·3944754	·9606177	3·4570315	3·5987590	·9653209	3·6976104	3·8304467	8
53	·9557074	3·2471895	3·3976816	·9606984	3·4608026	3·6023818	·9653968	3·7018830	3·8345713	7
54	·9557930	3·2505508	3·4008941	·9607792	3·4645813	3·6060121	·9654726	3·7061648	3·8387052	6
55	·9558785	3·2539184	3·4041130	·9608598	3·4683676	3·6096501	·9655484	3·7104558	3·8428482	5
56	·9559639	3·2572924	3·4073382	·9609403	3·4721616	3·6132957	·9656240	3·7147561	3·8470006	4
57	·9560492	3·2606728	3·4105699	·9610208	3·4759632	3·6169490	·9656996	3·7190658	3·8511622	3
58	·9561345	3·2640596	3·4138080	·9611012	3·4797726	3·6206101	·9657751	3·7233847	3·8553332	2
59	·9562197	3·2674529	3·4170526	·9611815	3·4835896	3·6242788	·9658505	3·7277131	3·8595135	1
60	·9563048	3·2708526	3·4203036	·9612617	3·4874144	3·6279553	·9659258	3·7320508	3·8637033	0
′	Cosines.	Cotangents.	Cosecants.	Cosines	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	′
	17°			16°			15°			

Natural Sines, Tangents, Secants, &c.

′	75°			76°			77°			′
	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	
0	·9659258	3·7320508	3·8637033	·9702957	4·0107809	4·1335655	·9743701	4·3314759	4·4454115	60
1	·9660011	3·7363980	3·8679025	·9703661	4·0157570	4·1383939	·9744355	4·3372816	4·4510198	59
2	·9660762	3·7407546	3·8721112	·9704363	4·0207446	4·1432339	·9745008	4·3430018	4·4566428	58
3	·9661513	3·7451207	3·8763293	·9705065	4·0257440	4·1480856	·9745660	4·3487866	4·4622803	57
4	·9662263	3·7494963	3·8805570	·9705766	4·0307550	4·1529491	·9746311	4·3545861	4·4679324	56
5	·9663012	3·7538815	3·8847943	·9706466	4·0357779	4·1578243	·9746962	4·3604003	4·4735993	55
6	·9663761	3·7582763	3·8890411	·9707165	4·0408125	4·1627114	·9747612	4·3662293	4·4792810	54
7	·9664508	3·7626807	3·8932976	·9707863	4·0458590	4·1676102	·9748261	4·3720731	4·4849775	53
8	·9665255	3·7670947	3·8975637	·9708561	4·0509174	4·1725210	·9748909	4·3779317	4·4906889	52
9	·9666001	3·7715185	3·9018395	·9709258	4·0559877	4·1774438	·9749556	4·3838054	4·4964152	51
10	·9666746	3·7759519	3·9061250	·9709953	4·0610700	4·1823785	·9750203	4·3896940	4·5021565	50
11	·9667490	3·7803951	3·9104203	·9710649	4·0661643	4·1873252	·9750849	4·3955977	4·5079129	49
12	·9668234	3·7848481	3·9147254	·9711343	4·0712707	4·1922840	·9751494	4·4015164	4·5136844	48
13	·9668977	3·7893109	3·9190403	·9712036	4·0763892	4·1972549	·9752138	4·4074504	4·5194711	47
14	·9669718	3·7937835	3·9233651	·9712729	4·0815199	4·2022380	·9752781	4·4133996	4·5252730	46
15	·9670459	3·7982661	3·9276997	·9713421	4·0866627	4·2072333	·9753423	4·4193641	4·5310903	45
16	·9671200	3·8027585	3·9320443	·9714112	4·0918178	4·2122408	·9754065	4·4253439	4·5369229	44
17	·9671939	3·8072609	3·9363988	·9714802	4·0969852	4·2172606	·9754706	4·4313392	4·5427709	43
18	·9672678	3·8117733	3·9407633	·9715491	4·1021649	4·2222928	·9755345	4·4373500	4·5486344	42
19	·9673415	3·8162957	3·9451379	·9716180	4·1073569	4·2273373	·9755985	4·4433762	4·5545134	41
20	·9674152	3·8208281	3·9495224	·9716867	4·1125614	4·2323943	·9756623	4·4494181	4·5604080	40
21	·9674888	3·8253707	3·9539171	·9717554	4·1177784	4·2374637	·9757260	4·4554756	4·5663183	39
22	·9675624	3·8299233	3·9583219	·9718240	4·1230079	4·2425457	·9757897	4·4615489	4·5722444	38
23	·9676358	3·8344861	3·9627369	·9718926	4·1282499	4·2476402	·9758533	4·4676379	4·5781862	37
24	·9677092	3·8390591	3·9671621	·9719610	4·1335046	4·2527474	·9759168	4·4737428	4·5841439	36
25	·9677825	3·8436424	3·9715975	·9720294	4·1387719	4·2578671	·9759802	4·4798636	4·5901174	35
26	·9678557	3·8482358	3·9760431	·9720976	4·1440519	4·2629996	·9760435	4·4860004	4·5961070	34
27	·9679288	3·8528396	3·9804991	·9721658	4·1493446	4·2681449	·9761068	4·4921532	4·6021126	33
28	·9680018	3·8574537	3·9849654	·9722339	4·1546501	4·2733029	·9761699	4·4983221	4·6081343	32
29	·9680748	3·8620782	3·9894421	·9723020	4·1599685	4·2784738	·9762330	4·5045072	4·6141722	31
30	·9681476	3·8667131	3·9939292	·9723699	4·1652998	4·2836576	·9762960	4·5107085	4·6202263	30
31	·9682204	3·8713584	3·9984267	·9724378	4·1706440	4·2888543	·9763589	4·5169261	4·6262967	29
32	·9682931	3·8760142	4·0029347	·9725056	4·1760011	4·2940640	·9764218	4·5231601	4·6323835	28
33	·9683658	3·8806805	4·0074532	·9725733	4·1813713	4·2992867	·9764845	4·5294105	4·6384867	27
34	·9684383	3·8853574	4·0119823	·9726409	4·1867546	4·3045225	·9765472	4·5356773	4·6446064	26
35	·9685108	3·8900448	4·0165219	·9727084	4·1921510	4·3097715	·9766098	4·5419608	4·6507427	25
36	·9685832	3·8947429	4·0210722	·9727759	4·1975606	4·3150336	·9766723	4·5482608	4·6568956	24
37	·9686555	3·8994516	4·0256332	·9728432	4·2029835	4·3203090	·9767347	4·5545776	4·6630652	23
38	·9687277	3·9041710	4·0302048	·9729105	4·2084196	4·3255977	·9767970	4·5609111	4·6692516	22
39	·9687998	3·9089011	4·0347872	·9729777	4·2138690	4·3308996	·9768593	4·5672615	4·6754548	21
40	·9688719	3·9136420	4·0393804	·9730449	4·2193318	4·3362150	·9769215	4·5736287	4·6816748	20
41	·9689438	3·9183937	4·0439844	·9731119	4·2248080	4·3415438	·9769836	4·5800129	4·6879119	19
42	·9690157	3·9231563	4·0485992	·9731789	4·2302977	4·3468861	·9770456	4·5864141	4·6941660	18
43	·9690875	3·9279297	4·0532249	·9732458	4·2358009	4·3522419	·9771075	4·5928325	4·7004372	17
44	·9691593	3·9327141	4·0578615	·9733125	4·2413177	4·3576113	·9771693	4·5992680	4·7067256	16
45	·9692309	3·9375094	4·0625091	·9733793	4·2468482	4·3629943	·9772311	4·6057207	4·7130313	15
46	·9693025	3·9423157	4·0671677	·9734459	4·2523923	4·3683910	·9772928	4·6121908	4·7193542	14
47	·9693740	3·9471331	4·0718374	·9735124	4·2579501	4·3738015	·9773544	4·6186783	4·7256945	13
48	·9694453	3·9519615	4·0765181	·9735789	4·2635218	4·3792257	·9774159	4·6251832	4·7320524	12
49	·9695167	3·9568011	4·0812100	·9736453	4·2691072	4·3846638	9774773	4·6317056	4·7384277	11
50	·9695879	3·9616518	4·0859130	·9737116	4·2747066	4·3901158	·9775387	4·6382457	4·7448206	10
51	·9696591	3·9665137	4·0906272	·9737778	4·2803199	4·3955817	·9775999	4·6448034	4·7512312	9
52	·9697301	3·9713868	4·0953526	·9738439	4·2859472	4·4010616	·9776611	4·6513788	4·7576596	8
53	·9698011	3·9762712	4·1000893	·9739100	4·2915885	4·4065556	·9777222	4·6579721	4·7641058	7
54	·9698720	3·9811669	4·1048374	·9739760	4·2972440	4·4120637	·9777832	4·6645832	4·7705699	6
55	·9699428	3·9860739	4·1095967	·9740419	4·3029136	4·4175859	·9778442	4·6712124	4·7770519	5
56	·9700136	3·9909924	4·1143675	·9741077	4·3085974	4·4231224	·9779050	4·6778595	4·7835520	4
57	·9700842	3·9959223	4·1191498	·9741734	4·3142955	4·4286731	·9779658	4·6845248	4·7900702	3
58	·9701548	4·0008636	4·1239435	·9742390	4·3200079	4·4342382	·9780265	4·6912083	4·7966066	2
59	·9702253	4·0058165	4·1287487	·9743046	4·3257347	4·4398176	·9780871	4·6979100	4·8031613	1
60	·9702957	4·0107809	4·1335655	·9743701	4·3314759	4·4454115	·9781476	4·7046301	4·8097343	0
′	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	′
	14°			13°			12°			

Natural Sines, Tangents, Secants, &c.

′	78°			79°			80°			′
	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	
0	·9781476	4·7046301	4·8097343	·9816272	5·1445540	5·2408431	·9848078	5·6712818	5·7587705	60
1	·9782080	4·7113686	4·8163258	·9816826	5·1525557	5·2486979	·9848582	5·6809446	5·7682867	59
2	·9782684	4·7181256	4·8229357	·9817380	5·1605813	5·2565768	·9849086	5·6906394	5·7778350	58
3	·9783287	4·7249012	4·8295643	·9817933	5·1686311	5·2644798	·9849589	5·7003663	5·7874153	57
4	·9783889	4·7316954	4·8362114	·9818485	5·1767051	5·2724070	·9850091	5·7101256	5·7970280	56
5	·9784490	4·7385083	4·8428774	·9819037	5·1848035	5·2803587	·9850593	5·7199173	5·8066732	55
6	·9785090	4·7453401	4·8495621	·9819587	5·1929264	5·2883347	·9851093	5·7297416	5·8163510	54
7	·9785689	4·7521907	4·8562657	·9820137	5·2010738	5·2963354	·9851593	5·7395988	5·8260617	53
8	·9786288	4·7590603	4·8629883	·9820686	5·2092459	5·3043608	·9852092	5·7494889	5·8358053	52
9	·9786886	4·7659490	4·8697299	·9821234	5·2174428	5·3124109	·9852590	5·7594122	5·8455820	51
10	·9787483	4·7728568	4·8764907	·9821781	5·2256647	5·3204860	·9853087	5·7693688	5·8553921	50
11	·9788079	4·7797837	4·8832707	·9822327	5·2339116	5·3285861	·9853583	5·7793588	5·8652356	49
12	·9788674	4·7867300	4·8900700	·9822873	5·2421836	5·3367114	·9854079	5·7893825	5·8751128	48
13	·9789268	4·7936957	4·8968886	·9823417	5·2504809	5·3448620	·9854574	5·7994400	5·8850238	47
14	·9789862	4·8006808	4·9037267	·9823961	5·2588035	5·3530379	·9855068	5·8095315	5·8949688	46
15	·9790455	4·8076854	4·9105844	·9824504	5·2671517	5·3612393	·9855561	5·8196572	5·9049479	45
16	·9791047	4·8147096	4·9174616	·9825046	5·2755255	5·3694664	·9856053	5·8298172	5·9149614	44
17	·9791638	4·8217536	4·9243586	·9825587	5·2839251	5·3777192	·9856544	5·8400117	5·9250095	43
18	·9792228	4·8288174	4·9312754	·9826128	5·2923505	5·3859979	·9857035	5·8502410	5·9350922	42
19	·9792818	4·8359010	4·9382120	·9826668	5·3008018	5·3943026	·9857524	5·8605051	5·9452098	41
20	·9793406	4·8430045	4·9451687	·9827206	5·3092793	5·4026333	·9858013	5·8708042	5·9553625	40
21	·9793994	4·8501282	4·9521453	·9827744	5·3177830	5·4109903	·9858501	5·8811386	5·9655504	39
22	·9794581	4·8572719	4·9591421	·9828282	5·3263131	5·4193737	·9858988	5·8915084	5·9757737	38
23	·9795167	4·8644359	4·9661591	·9828818	5·3348696	5·4277835	·9859475	5·9019138	5·9860326	37
24	·9795752	4·8716201	4·9731964	·9829353	5·3434527	5·4362199	·9859960	5·9123550	5·9963274	36
25	·9796337	4·8788248	4·9802541	·9829888	5·3520626	5·4446831	·9860445	5·9228322	6·0066581	35
26	·9796921	4·8860499	4·9873323	·9830422	5·3606993	5·4531731	·9860929	5·9333455	6·0170250	34
27	·9797504	4·8932956	4·9944311	·9830955	5·3693630	5·4616901	·9861412	5·9438952	6·0274282	33
28	·9798086	4·9005620	5·0015505	·9831487	5·3780538	5·4702342	·9861894	5·9544815	6·0378680	32
29	·9798667	4·9078491	5·0086907	·9832019	5·3867718	5·4788056	·9862375	5·9651045	6·0483445	31
30	·9799247	4·9151570	5·0158517	·9832549	5·3955172	5·4874043	·9862856	5·9757644	6·0588580	30
31	·9799827	4·9224859	5·0230337	·9833079	5·4042901	5·4960305	·9863336	5·9864614	6·0694085	29
32	·9800405	4·9298358	5·0302367	·9833608	5·4130906	5·5046843	·9863815	5·9971957	6·0799964	28
33	·9800983	4·9372068	5·0374607	·9834136	5·4219188	5·5133659	·9864293	6·0079676	6·0906219	27
34	·9801560	4·9445990	5·0447060	·9834663	5·4307750	5·5220754	·9864770	6·0187772	6·1012850	26
35	·9802136	4·9520125	5·0519726	·9835189	5·4396592	5·5308129	·9865246	6·0296247	6·1119861	25
36	·9802712	4·9594474	5·0592606	·9835715	5·4485715	5·5395786	·9865722	6·0405103	6·1227253	24
37	·9803286	4·9669037	5·0665701	·9836239	5·4575121	5·5483726	·9866196	6·0514343	6·1335028	23
38	·9803860	4·9743817	5·0739012	·9836763	5·4664812	5·5571951	·9866670	6·0623967	6·1443189	22
39	·9804433	4·9818813	5·0812539	·9837286	5·4754788	5·5660460	·9867143	6·0733979	6·1551736	21
40	·9805005	4·9894027	5·0886284	·9837808	5·4845052	5·5749258	·9867615	6·0844381	6·1660674	20
41	·9805576	4·9969459	5·0960248	·9838330	5·4935604	5·5838343	·9868087	6·0955174	6·1770003	19
42	·9806147	5·0045111	5·1034431	·9838850	5·5026446	5·5927719	·9868557	6·1066360	6·1879725	18
43	·9806716	5·0120984	5·1108835	·9839370	5·5117579	5·6017386	·9869027	6·1177943	6·1989843	17
44	·9807285	5·0197078	5·1183461	·9839889	5·5209005	5·6107345	·9869496	6·1289923	6·2100359	16
45	·9807853	5·0273395	5·1258309	·9840407	5·5300724	5·6197599	·9869964	6·1402303	6·2211275	15
46	·9808420	5·0349935	5·1333381	·9840924	5·5392740	5·6288148	·9870431	6·1515085	6·2322594	14
47	·9808986	5·0426700	5·1408677	·9841441	5·5485052	5·6378995	·9870897	6·1628272	6·2434316	13
48	·9809552	5·0503690	5·1484199	·9841956	5·5577663	5·6470140	·9871363	6·1741865	6·2546446	12
49	·9810116	5·0580907	5·1559948	·9842471	5·5670574	5·6561584	·9871827	6·1855867	6·2658984	11
50	·9810680	5·0658352	5·1635924	·9842985	5·5763786	5·6653331	·9872291	6·1970279	6·2771933	10
51	·9811243	5·0736025	5·1712128	·9843498	5·5857302	5·6745380	·9872754	6·2085106	6·2885295	9
52	·9811805	5·0813928	5·1788563	·9844010	5·5951121	5·6837734	·9873216	6·2200347	6·2999073	8
53	·9812366	5·0892061	5·1865228	·9844521	5·6045247	5·6930393	·9873678	6·2316007	6·3113269	7
54	·9812927	5·0970426	5·1942125	·9845032	5·6139680	5·7023360	·9874138	6·2432086	6·3227884	6
55	·9813486	5·1049024	5·2019254	·9845542	5·6234421	5·7116636	·9874598	6·2548588	6·3342923	5
56	·9814045	5·1127855	5·2096618	·9846050	5·6329474	5·7210223	·9875057	6·2665515	6·3458386	4
57	·9814603	5·1206921	5·2174216	·9846558	5·6424838	5·7304121	·9875514	6·2782868	6·3574276	3
58	·9815160	5·1286224	5·2252050	·9847066	5·6520516	5·7398333	·9875972	6·2900651	6·3690595	2
59	·9815716	5·1365763	5·2330121	·9847572	5·6616509	5·7492861	·9876428	6·3018866	6·3807347	1
60	·9816272	5·1445540	5·2408431	·9848078	5·6712818	5·7587705	·9876883	6·3137515	6·3924532	0
′	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	′
	11°			10°			9°			

Natural Sines, Tangents, Secants, &c.

′	81°			82°			83°			′
	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	
0	·9876883	6·3137515	6·3924532	·9902681	7·1153697	7·1852965	·9925462	8·1443464	8·2055090	60
1	·9877338	6·3256601	6·4042154	·9903085	7·1304190	7·2001996	·9925816	8·1639786	8·2249952	59
2	·9877792	6·3376126	6·4160216	·9903489	7·1455308	7·2151653	·9926169	8·1837041	8·2445748	58
3	·9878245	6·3496092	6·4278719	·9903891	7·1607056	7·2301940	·9926521	8·2035239	8·2642485	57
4	·9878697	6·3616502	6·4397666	·9904293	7·1759437	7·2452859	·9926873	8·2234384	8·2840171	56
5	·9879148	6·3737359	6·4517059	·9904694	7·1912456	7·2604417	·9927224	8·2434485	8·3038812	55
6	·9879599	6·3858665	6·4636901	·9905095	7·2066116	7·2756616	·9927573	8·2635547	8·3238415	54
7	·9880048	6·3980422	6·4757195	·9905494	7·2220422	7·2909460	·9927922	8·2837579	8·3438986	53
8	·9880497	6·4102633	6·4877944	·9905893	7·2375378	7·3062954	·9928271	8·3040586	8·3640534	52
9	·9880945	6·4225301	6·4999148	·9906290	7·2530987	7·3217102	·9928618	8·3244577	8·3843065	51
10	·9881392	6·4348428	6·5120812	·9906687	7·2687255	7·3371909	·9928965	8·3449558	8·4046586	50
11	·9881838	6·4472017	6·5242938	·9907083	7·2844184	7·3527377	·9929310	8·3655536	8·4251105	49
12	·9882284	6·4596070	6·5365528	·9907478	7·3001780	7·3683512	·9929655	8·3862519	8·4456629	48
13	·9882728	6·4720591	6·5488586	·9907873	7·3160047	7·3840318	·9929999	8·4070515	8·4663165	47
14	·9883172	6·4845581	6·5612113	·9908266	7·3318989	7·3997798	·9930342	8·4279531	8·4870721	46
15	·9883615	6·4971043	6·5736112	·9908659	7·3478610	7·4155959	·9930685	8·4489573	8·5079304	45
16	·9884057	6·5096981	6·5860587	·9909051	7·3638916	7·4314803	·9931026	8·4700651	8·5288923	44
17	·9884498	6·5223396	6·5985540	·9909442	7·3799909	7·4474335	·9931367	8·4912772	8·5499584	43
18	·9884939	6·5350293	6·6110973	·9909832	7·3961595	7·4634560	·9931706	8·5125943	8·5711295	42
19	·9885378	6·5477672	6·6236890	·9910221	7·4123978	7·4795482	·9932045	8·5340172	8·5924065	41
20	·9885817	6·5605538	6·6363293	·9910610	7·4287064	7·4957106	·9932384	8·5555468	8·6137901	40
21	·9886255	6·5733892	6·6490184	·9910997	7·4450855	7·5119437	·9932721	8·5771838	8·6352812	39
22	·9886692	6·5862739	6·6617568	·9911384	7·4615357	7·5282478	·9933057	8·5989290	8·6568805	38
23	·9887128	6·5992080	6·6745446	·9911770	7·4780576	7·5446236	·9933393	8·6207833	8·6785889	37
24	·9887564	6·6121919	6·6873822	·9912155	7·4946514	7·5610713	·9933728	8·6427475	8·7004071	36
25	·9887998	6·6252258	6·7002699	·9912540	7·5113178	7·5775916	·9934062	8·6648223	8·7223361	35
26	·9888432	6·6383100	6·7132079	·9912923	7·5280571	7·5941849	·9934395	8·6870088	8·7443766	34
27	·9888865	6·6514449	6·7261965	·9913306	7·5448699	7·6108516	·9934727	8·7093077	8·7665295	33
28	·9889297	6·6646307	6·7392360	·9913688	7·5617567	7·6275923	·9935058	8·7317198	8·7887957	32
29	·9889728	6·6778677	6·7523268	·9914069	7·5787179	7·6444075	·9935389	8·7542461	8·8111761	31
30	·9890159	6·6911562	6·7654691	·9914449	7·5957541	7·6612976	·9935719	8·7768874	8·8336715	30
31	·9890588	6·7044966	6·7786632	·9914828	7·6128657	7·6782631	·9936047	8·7996446	8·8562828	29
32	·9891017	6·7178891	6·7919095	·9915206	7·6300533	7·6953047	·9936375	8·8225186	8·8790109	28
33	·9891445	6·7313341	6·8052082	·9915584	7·6473174	7·7124227	·9936703	8·8455103	8·9018567	27
34	·9891872	6·7448318	6·8185597	·9915961	7·6646584	7·7296176	·9937029	8·8686206	8·9248211	26
35	·9892298	6·7583826	6·8319642	·9916337	7·6820769	7·7468901	·9937355	8·8918505	8·9479051	25
36	·9892723	6·7719867	6·8454222	·9916712	7·6995735	7·7642406	·9937679	8·9152009	8·9711095	24
37	·9893148	6·7856446	6·8589338	·9917086	7·7171486	7·7816697	·9938003	8·9386726	8·9944354	23
38	·9893572	6·7993565	6·8724995	·9917459	7·7348028	7·7991778	·9938326	8·9622668	9·0178837	22
39	·9893994	6·8131227	6·8861195	·9917832	7·7525366	7·8167656	·9938648	8·9859843	9·0414553	21
40	·9894416	6·8269437	6·8997942	·9918204	7·7703506	7·8344335	·9938969	9·0098261	9·0651512	20
41	·9894838	6·8408196	6·9135239	·9918574	7·7882453	7·8521821	·9939290	9·0337933	9·0889725	19
42	·9895258	6·8547508	6·9273089	·9918944	7·8062212	7·8700120	·9939610	9·0578867	9·1129200	18
43	·9895677	6·8687378	6·9411496	·9919314	7·8242790	7·8879238	·9939928	9·0821074	9·1369949	17
44	·9896096	6·8827807	6·9550464	·9919682	7·8424191	7·9059179	·9940246	9·1064564	9·1611980	16
45	·9896514	6·8968799	6·9689994	·9920049	7·8606423	7·9239950	·9940563	9·1309348	9·1855305	15
46	·9896931	6·9110359	6·9830092	·9920416	7·8789489	7·9421556	·9940880	9·1555436	9·2099934	14
47	·9897347	6·9252489	6·9970760	·9920782	7·8973396	7·9604003	·9941195	9·1802838	9·2345877	13
48	·9897762	6·9395192	7·0112001	·9921147	7·9158151	7·9787298	·9941510	9·2051564	9·2593145	12
49	·9898177	6·9538473	7·0253820	·9921511	7·9343758	7·9971445	·9941823	9·2301627	9·2841749	11
50	·9898590	6·9682335	7·0396220	·9921874	7·9530224	8·0156450	·9942136	9·2553035	9·3091699	10
51	·9899003	6·9826781	7·0539205	·9922237	7·9717555	8·0342321	·9942448	9·2805802	9·3343006	9
52	·9899415	6·9971806	7·0682777	·9922599	7·9905756	8·0529062	·9942760	9·3059936	9·3595682	8
53	·9899826	7·0117441	7·0826941	·9922959	8·0094835	8·0716681	·9943070	9·3315450	9·3849738	7
54	·9900237	7·0263662	7·0971700	·9923319	8·0284796	8·0905182	·9943379	9·3572355	9·4105184	6
55	·9900646	7·0410482	7·1117059	·9923679	8·0475647	8·1094573	·9943688	9·3830663	9·4362033	5
56	·9901055	7·0557905	7·1263019	·9924037	8·0667394	8·1284860	·9943996	9·4090384	9·4620296	4
57	·9901462	7·0705934	7·1409587	·9924394	8·0860042	8·1476048	·9944303	9·4351531	9·4879984	3
58	·9901869	7·0854573	7·1556764	·9924751	8·1053599	8·1668145	·9944609	9·4614116	9·5141110	2
59	·9902275	7·1003826	7·1704556	·9925107	8·1248071	8·1861157	·9944914	9·4878149	9·5403686	1
60	·9902681	7·1153697	7·1852965	·9925462	8·1443464	8·2055090	·9945219	9·5143645	9·5667722	0
′	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	′
	8°			7°			6°			

Natural Sines, Tangents, Secants, &c.

′	84°			85°			86°			′
	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	
0	·9945219	9·5143645	9·5667722	·9961947	11·430052	11·473713	·9975641	14·300666	14·335587	60
1	·9945523	9·5410613	9·5933233	·9962200	11·468474	11·511990	·9975843	14·360696	14·395471	59
2	·9945825	9·5679068	9·6200229	·9962452	11·507154	11·550523	·9976045	14·421230	14·455859	58
3	·9946127	9·5949022	9·6468724	·9962704	11·546093	11·589316	·9976245	14·482273	14·516757	57
4	·9946428	9·6220486	9·6738730	·9962954	11·585294	11·628372	·9976445	14·543833	14·578172	56
5	·9946729	9·6493475	9·7010260	·9963204	11·624761	11·667693	·9976645	14·605916	14·640109	55
6	·9947028	9·6768000	9·7283327	·9963453	11·664495	11·707282	·9976843	14·668529	14·702576	54
7	·9947327	9·7044075	9·7557944	·9963701	11·704500	11·747141	·9977040	14·731679	14·765580	53
8	·9947625	9·7321713	9·7834124	·9963948	11·744779	11·787274	·9977237	14·795372	14·829128	52
9	·9947921	9·7600927	9·8111880	·9964195	11·785333	11·827683	·9977433	14·859616	14·893226	51
10	·9948217	9·7881732	9·8391227	·9964440	11·826167	11·868370	·9977627	14·924417	14·957882	50
11	·9948513	9·8164140	9·8672176	·9964685	11·867282	11·909340	·9977821	14·989784	15·023103	49
12	·9948807	9·8448166	9·8954744	·9964929	11·908682	11·950595	·9978015	15·055723	15·088896	48
13	·9949101	9·8733823	9·9238943	·9965172	11·950370	11·992137	·9978207	15·122242	15·155270	47
14	·9949393	9·9021125	9·9524787	·9965414	11·992349	12·033970	·9978399	15·189349	15·222231	46
15	·9949685	9·9310088	9·9812291	·9965655	12·034622	12·076098	·9978589	15·257052	15·289788	45
16	·9949976	9·9600724	10·010147	·9965895	12·077192	12·118522	·9978779	15·325358	15·357949	44
17	·9950266	9·9893050	10·039234	·9966135	12·120062	12·161246	·9978968	15·394276	15·426721	43
18	·9950556	10·018708	10·068491	·9966374	12·163236	12·204274	·9979156	15·463814	15·496114	42
19	·9950844	10·048283	10·097920	·9966612	12·206716	12·247608	·9979343	15·533981	15·566135	41
20	·9951132	10·078031	10·127522	·9966849	12·250505	12·291252	·9979530	15·604784	15·636793	40
21	·9951419	10·107954	10·157300	·9967085	12·294609	12·335210	·9979716	15·676233	15·708096	39
22	·9951705	10·138054	10·187254	·9967321	12·339028	12·379484	·9979900	15·748337	15·780054	38
23	·9951990	10·168332	10·217386	·9967555	12·383768	12·424078	·9980084	15·821105	15·852676	37
24	·9952274	10·198789	10·247697	·9967789	12·428831	12·468995	·9980267	15·894545	15·925971	36
25	·9952557	10·229428	10·278190	·9968022	12·474221	12·514240	·9980450	15·968667	15·999948	35
26	·9952840	10·260249	10·308866	·9968254	12·519942	12·559815	·9980631	16·043482	16·074617	34
27	·9953122	10·291255	10·339726	·9968485	12·565997	12·605724	·9980811	16·118998	16·149987	33
28	·9953403	10·322447	10·370772	·9968715	12·612390	12·651971	·9980991	16·195225	16·226069	32
29	·9953683	10·353827	10·402007	·9968945	12·659125	12·698560	·9981170	16·272174	16·302873	31
30	·9953962	10·385397	10·433431	·9969173	12·706205	12·745495	·9981348	16·349855	16·380408	30
31	·9954240	10·417158	10·465046	·9969401	12·753634	12·792779	·9981525	16·428279	16·458686	29
32	·9954518	10·449112	10·496854	·9969628	12·801417	12·840416	·9981701	16·507456	16·537717	28
33	·9954795	10·481261	10·528857	·9969854	12·849557	12·888410	·9981877	16·587396	16·617512	27
34	·9955070	10·513607	10·561057	·9970080	12·898058	12·936765	·9982052	16·668112	16·698082	26
35	·9955345	10·546151	10·593455	·9970304	12·946924	12·985486	·9982225	16·749614	16·779439	25
36	·9955620	10·578895	10·626054	·9970528	12·996160	13·034576	·9982398	16·831915	16·861594	24
37	·9955893	10·611841	10·658854	·9970750	13·045769	13·084040	·9982570	16·915025	16·944559	23
38	·9956165	10·644992	10·691859	·9970972	13·095757	13·133882	·9982742	16·998957	17·028346	22
39	·9956437	10·678348	10·725070	·9971193	13·146127	13·184106	·9982912	17·083724	17·112966	21
40	·9956708	10·711913	10·758488	·9971413	13·196883	13·234717	·9983082	17·169337	17·198434	20
41	·9956978	10·745687	10·792117	·9971633	13·248031	13·285719	·9983250	17·255809	17·284761	19
42	·9957247	10·779673	10·825957	·9971851	13·299574	13·337116	·9983418	17·343155	17·371960	18
43	·9957515	10·813872	10·860011	·9972069	13·351518	13·388914	·9983585	17·431385	17·460046	17
44	·9957783	10·848288	10·894281	·9972286	13·403867	13·441118	·9983751	17·520516	17·549030	16
45	·9958049	10·882921	10·928768	·9972502	13·456625	13·493731	·9983917	17·610559	17·638928	15
46	·9958315	10·917775	10·963476	·9972717	13·509799	13·546758	·9984081	17·701529	17·729753	14
47	·9958580	10·952850	10·998406	·9972931	13·563391	13·600205	·9984245	17·793442	17·821520	13
48	·9958844	10·988150	11·033560	·9973145	13·617409	13·654077	·9984408	17·886310	17·914243	12
49	·9959107	11·023676	11·068940	·9973357	13·671856	13·708379	·9984570	17·980150	18·007937	11
50	·9959370	11·059431	11·104549	·9973569	13·726738	13·763115	·9984731	18·074977	18·102619	10
51	·9959631	11·095416	11·140389	·9973780	13·782060	13·818291	·9984891	18·170807	18·198303	9
52	·9959892	11·131635	11·176462	·9973990	13·837827	13·873913	·9985050	18·267654	18·295005	8
53	·9960152	11·168089	11·212770	·9974199	13·894045	13·929985	·9985209	18·365537	18·392742	7
54	·9960411	11·204780	11·249316	·9974408	13·950719	13·986514	·9985367	18·464471	18·491530	6
55	·9960669	11·241712	11·286101	·9974615	14·007856	14·043504	·9985524	18·564473	18·591387	5
56	·9960926	11·278885	11·323129	·9974822	14·065459	14·100963	·9985680	18·665562	18·692330	4
57	·9961183	11·316304	11·360402	·9975028	14·123536	14·158894	·9985835	18·767754	18·794377	3
58	·9961438	11·353970	11·397922	·9975233	14·182092	14·217304	·9985989	18·871068	18·897545	2
59	·9961693	11·391885	11·435692	·9975437	14·241134	14·276200	·9986143	18·975523	19·001854	1
60	·9961947	11·430052	11·473713	·9975641	14·300666	14·335587	·9986295	19·081137	19·107323	0
′	Cosines.	Cotangents.	Cosecants.	Cosines	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	′
	5°			4°			3°			

Natural Sines, Tangents, Secants, &c.

′	87°			88°			89°			′
	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	Sines.	Tangents.	Secants.	
0	·9986295	19·081137	19·107323	·9993908	28·636253	28·653708	·9998477	57·289962	57·298688	60
1	·9986447	19·187930	19·213970	·9994009	28·877089	28·894398	·9998527	58·261174	58·269755	59
2	·9986598	19·295922	19·321816	·9994110	29·122005	29·139169	·9998577	59·265872	59·274308	58
3	·9986748	19·405133	19·430882	·9994209	29·371106	29·388124	·9998625	60·305820	60·314110	57
4	·9986898	19·515584	19·541187	·9994308	29·624499	29·641373	·9998673	61·382905	61·391050	56
5	·9987046	19·627296	19·652754	·9994405	29·882299	29·899026	·9998720	62·499154	62·507153	55
6	·9987194	19·740291	19·765604	·9994502	30·144619	30·161201	·9998766	63·656741	63·664595	54
7	·9987340	19·854591	19·879758	·9994598	30·411580	30·428017	·9998812	64·858008	64·865716	53
8	·9987486	19·970219	19·995241	·9994693	30·683307	30·699598	·9998856	66·105473	66·113036	52
9	·9987631	20·087199	20·112075	·9994788	30·959928	30·976074	·9998900	67·401854	67·409272	51
10	·9987775	20·205553	20·230284	·9994881	31·241577	31·257577	·9998942	68·750087	68·757360	50
11	·9987919	20·325308	20·349893	·9994974	31·528392	31·544246	·9998984	70·153346	70·160474	49
12	·9988061	20·446486	20·470926	·9995066	31·820516	31·836225	·9999025	71·615070	71·622052	48
13	·9988203	20·569115	20·593409	·9995157	32·118099	32·133663	·9999065	73·138991	73·145827	47
14	·9988344	20·693220	20·717368	·9995247	32·421295	32·436713	·9999105	74·729165	74·735856	46
15	·9988484	20·818828	20·842830	·9995336	32·730264	32·745537	·9999143	76·390009	76·396564	45
16	·9988623	20·945966	20·969824	·9995424	33·045173	33·060300	·9999181	78·126342	78·132742	44
17	·9988761	21·074664	21·098376	·9995512	33·366194	33·381176	·9999218	79·943430	79·949684	43
18	·9988899	21·204949	21·228515	·9995599	33·693509	33·708345	·9999254	81·847041	81·853150	42
19	·9989035	21·336851	21·360272	·9995684	34·027303	34·041994	·9999289	83·843507	83·849470	41
20	·9989171	21·470401	21·493676	·9995770	34·367771	34·382316	·9999323	85·939791	85·945609	40
21	·9989306	21·605630	21·628759	·9995854	34·715115	34·729515	·9999357	88·148572	88·149244	39
22	·9989440	21·742569	21·765553	·9995937	35·069546	35·083800	·9999389	90·463336	90·468863	38
23	·9989573	21·881251	21·904090	·9996020	35·431282	35·445391	·9999421	92·908487	92·913869	37
24	·9989706	22·021710	22·044403	·9996101	35·800553	35·814517	·9999452	95·489475	95·494711	36
25	·9989837	22·163980	22·186528	·9996182	36·177596	36·191414	·9999482	98·217943	98·223033	35
26	·9989968	22·308097	22·330499	·9996262	36·562659	36·576332	·9999511	101·10690	101·11185	34
27	·9990098	22·454096	22·476353	·9996341	36·956001	36·969528	·9999539	104·17094	104·17574	33
28	·9990227	22·602015	22·624126	·9996419	37·357892	37·371273	·9999567	107·42648	107·43114	32
29	·9990355	22·751892	22·773857	·9996497	37·768613	37·781849	·9999593	110·89205	110·89656	31
30	·9990482	22·903766	22·925586	·9996573	38·188459	38·201550	·9999619	114·58865	114·59301	30
31	·9990609	23·057677	23·079351	·9996649	38·617738	38·630683	·9999644	118·54018	118·54440	29
32	·9990734	23·213666	23·235196	·9996724	39·056771	39·069571	·9999668	122·77396	122·77803	28
33	·9990859	23·371777	23·393161	·9996798	39·505895	39·518549	·9999692	127·32134	127·32526	27
34	·9990983	23·532052	23·553291	·9996871	39·965460	39·977969	·9999714	132·21851	132·22229	26
35	·9991106	23·694537	23·715630	·9996943	40·435837	40·448201	·9999736	137·50745	137·51108	25
36	·9991228	23·859277	23·880224	·9997015	40·917412	40·929630	·9999756	143·23712	143·24061	24
37	·9991350	24·026320	24·047121	·9997086	41·410588	41·422660	·9999776	149·46502	149·46837	23
38	·9991470	24·195714	24·216370	·9997156	41·915790	41·927717	·9999795	156·25908	156·26228	22
39	·9991590	24·367509	24·388020	·9997224	42·433464	42·445245	·9999813	163·70019	163·70325	21
40	·9991709	24·541758	24·562123	·9997292	42·964077	42·975713	·9999831	171·88540	171·88831	20
41	·9991827	24·718512	24·738731	·9997360	43·508122	43·519612	·9999847	180·93220	180·93496	19
42	·9991944	24·897826	24·917900	·9997426	44·066113	44·077458	·9999863	190·98419	190·98680	18
43	·9992060	25·079757	25·099685	·9997492	44·638596	44·649795	·9999878	202·21875	202·22122	17
44	·9992176	25·264361	25·284144	·9997556	45·226141	45·237195	·9999892	214·85762	214·85995	16
45	·9992290	25·451700	25·471337	·9997620	45·829351	45·840260	·9999905	229·18166	229·18385	15
46	·9992404	25·641832	25·661324	·9997683	46·448862	46·459625	·9999917	245·55198	245·55402	14
47	·9992517	25·834823	25·854169	·9997745	47·085343	47·095961	·9999928	264·44080	264·44269	13
48	·9992629	26·030736	26·049937	·9997807	47·739501	47·749974	·9999939	286·47773	286·47948	12
49	·9992740	26·229638	26·248694	·9997867	48·412084	48·422411	·9999949	312·52137	312·52297	11
50	·9992851	26·431600	26·450510	·9997927	49·103881	49·114062	·9999958	343·77371	343·77516	10
51	·9992960	26·636690	26·655455	·9997986	49·815726	49·825762	·9999966	381·97099	381·97230	9
52	·9993069	26·844984	26·863603	·9998044	50·548506	50·558396	·9999973	429·71757	429·71873	8
53	·9993177	27·056557	27·075030	·9998101	51·303157	51·312902	·9999979	491·10600	491·10702	7
54	·9993284	27·271486	27·289814	·9998157	52·080673	52·090272	·9999985	572·95721	572·95809	6
55	·9993390	27·489853	27·508035	·9998213	52·882109	52·891564	·9999989	687·54887	687·54960	5
56	·9993495	27·711740	27·729777	·9998267	53·708587	53·717896	·9999993	859·43630	859·43689	4
57	·9993600	27·937233	27·955125	·9998321	54·561300	54·570464	·9999996	1145·9153	1145·9157	3
58	·9993704	28·166422	28·184168	·9998374	55·441517	55·450534	·9999998	1718·8732	1718·8735	2
59	·9993806	28·399397	28·416997	·9998426	56·350590	56·359462	1·0000000	3437·7467	3437·7468	1
60	·9993908	28·636253	28·653708	·9998477	57·289962	57·298688	1·0000000	Infinite.	Infinite.	0
′	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	Cosines.	Cotangents.	Cosecants.	′
	2°			1°			0°			

Corresponding Thermometric Scales.

Fahr.	Cent.	Reau.	Fahr.	Cent.	Reau.	Fahr.	Cent.	Reau.	Fahr.	Cent.	Reau.
212	100·0	80·0	150	65·6	52·4	88	31·1	24·9	26	− 3·3	− 2·7
211	99·4	79·6	149	65·0	52·0	87	30·6	24·4	25	− 3·9	− 3·1
210	98·9	79·1	148	64·4	51·6	86	30·0	24·0	24	− 4·4	− 3·6
209	98·3	78·7	147	63·9	51·1	85	29·4	23·6	23	− 5·0	− 4·0
208	97·8	78·2	146	63·3	50·7	84	28·9	23·1	22	− 5·6	− 4·4
207	97·2	77·8	145	62·8	50·2	83	28·3	22·7	21	− 6·1	− 4·9
206	96·7	77·3	144	62·2	49·8	82	27·8	22·2	20	− 6·7	− 5·3
205	96·1	76·9	143	61·7	49·3	81	27·2	21·8	19	− 7·2	− 5·8
204	95·6	76·4	142	61·1	48·9	80	26·7	21·3	18	− 7·8	− 6·2
203	95·0	76·0	141	60·6	48·4	79	26·1	20·9	17	− 8·3	− 6·7
202	94·4	75·6	140	60·0	48·0	78	25·6	20·4	16	− 8·9	− 7·1
201	93·9	75·1	139	59·4	47·6	77	25·0	20·0	15	− 9·5	− 7·6
200	93·3	74·7	138	58·9	47·1	76	24·4	19·6	14	− 10·0	− 8·0
199	92·8	74·2	137	58·3	46·7	75	23·9	19·1	13	− 10·6	− 8·4
198	92·2	73·8	136	57·8	46·2	74	23·3	18·7	12	− 11·1	− 8·9
197	91·7	73·3	135	57·2	45·8	73	22·8	18·2	11	− 11·7	− 9·3
196	91·1	72·9	134	56·7	45·3	72	22·2	17·8	10	− 12·2	− 9·8
195	90·6	72·4	133	56·1	44·9	71	21·7	17·3	9	− 12·8	− 10·2
194	90·0	72·0	132	55·6	44·4	70	21·1	16·9	8	− 13·3	− 10·7
193	89·4	71·6	131	55·0	44·0	69	20·6	16·4	7	− 13·9	− 11·1
192	88·9	71·1	130	54·4	43·6	68	20·0	16·0	6	− 14·4	− 11·6
191	88·3	70·7	129	53·9	43·1	67	19·4	15·6	5	− 15·0	− 12·0
190	87·8	70·2	128	53·3	42·7	66	18·9	15·1	4	− 15·6	− 12·4
189	87·2	69·8	127	52·8	42·2	65	18·3	14·7	3	− 16·1	− 12·9
188	86·7	69·3	126	52·2	41·8	64	17·8	14·2	2	− 16·7	− 13·3
187	86·1	68·9	125	51·7	41·3	63	17·2	13·8	1	− 17·2	− 13·8
186	85·6	68·4	124	51·1	40·9	62	16·7	13·3	0	− 17·8	− 14·2
185	85·0	68·0	123	50·6	40·4	61	16·1	12·9	− 1	− 18·3	− 14·7
184	84·4	67·6	122	50·0	40·0	60	15·6	12·4	− 2	− 18·9	− 15·1
183	83·9	67·1	121	49·4	39·6	59	15·0	12·0	− 3	− 19·4	− 15·6
182	83·3	66·7	120	48·9	39·1	58	14·4	11·6	− 4	− 20·0	− 16·0
181	82·8	66·2	119	48·3	38·7	57	13·9	11·1	− 5	− 20·6	− 16·4
180	82·2	65·8	118	47·8	38·2	56	13·3	10·7	− 6	− 21·1	− 16·9
179	81·7	65·3	117	47·2	37·8	55	12·8	10·2	− 7	− 21·7	− 17·3
178	81·1	64·9	116	46·7	37·3	54	12·2	9·8	− 8	− 22·2	− 17·8
177	80·6	64·4	115	46·1	36·9	53	11·7	9·3	− 9	− 22·8	− 18·2
176	80·0	64·0	114	45·6	36·4	52	11·1	8·9	− 10	− 23·3	− 18·7
175	79·4	63·6	113	45·0	36·0	51	10·6	8·4	− 11	− 23·9	− 19·1
174	78·9	63·1	112	44·4	35·6	50	10·0	8·0	− 12	− 24·4	− 19·6
173	78·3	62·7	111	43·9	35·1	49	9·4	7·6	− 13	− 25·0	− 20·0
172	77·8	62·2	110	43·3	34·7	48	8·9	7·1	− 14	− 25·6	− 20·4
171	77·2	61·8	109	42·8	34·2	47	8·3	6·7	− 15	− 26·1	− 20·9
170	76·7	61·3	108	42·2	33·8	46	7·8	6·2	− 16	− 26·7	− 21·3
169	76·1	60·9	107	41·7	33·3	45	7·2	5·8	− 17	− 27·2	− 21·8
168	75·6	60·4	106	41·1	32·9	44	6·7	5·3	− 18	− 27·8	− 22·2
167	75·0	60·0	105	40·6	32·4	43	6·1	4·9	− 19	− 28·3	− 22·7
166	74·4	59·6	104	40·0	32·0	42	5·6	4·4	− 20	− 28·9	− 23·1
165	73·9	59·1	103	39·4	31·6	41	5·0	4·0	− 21	− 29·4	− 23·6
164	73·3	58·7	102	38·9	31·1	40	4·4	3·6	− 22	− 30·0	− 24·0
163	72·8	58·2	101	38·3	30·7	39	3·9	3·1	− 23	− 30·6	− 24·4
162	72·2	57·8	100	37·8	30·2	38	3·3	2·7	− 24	− 31·1	− 24·9
161	71·7	57·3	99	37·2	29·8	37	2·8	2·2	− 25	− 31·7	− 25·3
160	71·1	56·9	98	36·7	29·3	36	2·2	1·8	− 26	− 32·2	− 25·8
159	70·6	56·4	97	36·1	28·9	35	1·7	1·3	− 27	− 32·8	− 26·2
158	70·0	56·0	96	35·6	28·4	34	1·1	0·9	− 28	− 33·3	− 26·7
157	69·4	55·6	95	35·0	28·0	33	0·6	0·4	− 29	− 33·9	− 27·1
156	68·9	55·1	94	34·4	27·6	32	0·0	0·0	− 30	− 34·4	− 27·6
155	68·3	54·7	93	33·9	27·1	31	− 0·6	− 0·4	− 31	− 35·0	− 28·0
154	67·8	54·2	92	33·3	26·7	30	− 1·1	− 0·9	− 32	− 35·6	− 28·4
153	67·2	53·8	91	32·8	26·2	29	− 1·7	− 1·3	− 33	− 36·1	− 28·9
152	66·7	53·3	90	32·2	25·8	28	− 2·2	− 1·8	− 34	− 36·7	− 29·3
151	66·1	52·9	89	31·7	25·3	27	− 2·8	− 2·2	− 35	− 37·2	− 29·8

Reduction of French to English Measures.

Length.

1 millimetre = ·03937 inch, or about $\frac{1}{25}$ inch.
1 centimetre = ·3937 inch.
1 decimetre = 3·937 inch.
1 metre = 39·37 inch = 3·281 ft. = 1·0936 yd.
1 kilometre = 1093·6 yds., or about $\frac{5}{8}$ mile.
More accurately, 1 metre = 39·370432 in. = 3·2808693 ft. = 1·09362311 yd.

Area.

1 sq. millim. = ·00155 sq. in.
1 sq. centim. = ·155 sq. in.
1 sq. decim. = 15·5 sq. in.
1 sq. metre = 1550 sq. in. = 10·764 sq. ft. = 1·196 sq. yd.

Volume.

1 cub. millim. = ·000061 cub. in.
1 cub. centim. = ·061025 cub. in.
1 cub. decim. = 61·0254 cub. in.
cub. metre = 61025 cub. in. = 35·3156 cub. ft. = 1·308 cub. yd.

The litre (used for liquids) is the same as the cubic decimetre, and is equal to 1·7617 pint, or ·22021 gallon.

Mass and Weight.

1 milligramme = ·01543 grain.
1 gramme = 15·432 grain.
1 kilogramme = 15432 grains = 2·205 lbs. avoir.
More accurately, the kilogramme is 2·20462125 lbs.

Miscellaneous.

1 gramme per sq. centim. = 2·0481 lbs. per sq. ft.
1 kilogramme per sq. centim. = 14·223 lbs. per sq. in.
1 kilogrammetre = 7·2331 foot-pounds.
1 force de cheval = 75 kilogrammetres per second, or 542½ foot-pounds per second nearly, whereas 1 horse-power (English) = 550 foot-pounds per second.

Reduction to C.G.S. Measures.

[*cm.* denotes centimetre(s); *gm.* denotes gramme(s).]

Length.

1 inch = 2·54 centimetres, nearly.
1 foot = 30·48 centimetres, nearly.
1 yard = 91·44 centimetres, nearly.
1 statute mile = 160933 centimetres, nearly.
More accurately, 1 inch = 2·5399772 centimetres.

Area.

1 sq. inch = 6·45 sq. cm., nearly.
1 sq. foot = 929 sq. cm., nearly.
1 sq. yard = 8361 sq. cm., nearly.
1 sq. mile = $2{\cdot}59 \times 10^{10}$ sq. cm., nearly.

Volume.

1 cub. inch = 16·39 cub. cm., nearly.
1 cub. foot = 28316 cub. cm., nearly.
1 cub. yard = 764535 cub. cm., nearly.
1 gallon = 4541 cub. cm., nearly.

Mass.

1 grain = ·0648 gramme, nearly.
1 oz. avoir. = 28·35 gramme, nearly.
1 lb. avoir. = 453·6 gramme, nearly.
1 ton = $1{\cdot}016 \times 10^6$ gramme, nearly.
More accurately, 1 lb. avoir. = 453·59265 *gm.*

Velocity.

1 mile per hour = 44·704 cm. per sec.
1 kilometre per hour = 27·7 cm. per sec.

Density.

1 lb. per cub. foot = ·016019 gm. per cub. cm.
62·4 lbs. per cub. ft. = 1 gm. per cub. cm.

TABLE 47.

Astronomical Data.

Name.	Symbol.	Mean Diam.	Mean Distance from Sun.	Revolution round Sun.	Rotation on Axis.	Velocity in Orbit per Second.	Inclination of Equator to Orbit.	Approximate Diameter from Earth.	
								Greatest.	Least.
		Miles.	Miles.			Miles.	° ′	″	″
Sun . .	☉	853,000	...	...	25–26 days	...	...	1956	1892
					h. m. s.				
Mercury .	☿	2,960	35½ millions	87·97 days	24 5 0	29·55	Unknown.	12	5
Venus . .	♀	7,510	66¼ „	224·70 „	23 21 0	21·61	49 58	76	10
Earth . .	♁	7,900	92½ „	365·26 „	23 56 4·09	18·38	23 27	...	...
Mars . .	♂	4,920	139¼ „	686·98 „	24 37 22·7	14·99	28 51	30	4
Jupiter .	♃	86,000	476 „	11·86 years	9 55 20	8·06	3 4	50	30
Saturn .	♄	71,900	872 „	29·46 „	10 14 0	5·95	26 49	21	15
Uranus .	♅	33,000	1,754 „	84·02 „	Unknown.	4·20	100 20	4	3
Neptune .	♆	36,600	2,746 „	164·78 „	...	3·36	Unknown.	2	2
The Moon	☽	2,160	238,000 miles from the earth.	27·322 days round earth.	27 7 44	...	...	1992	1768

Earth's equatorial radius = 20926202 feet.
Earth's polar radius = 20854895 feet.
Compression = $\frac{1}{293}$.
Obliquity of ecliptic decreases 47″ per century, probable limits 21° 58′ 36″ and 24° 35′ 58″.

Number of minor planets situated between Mars and Jupiter (1887) = 271.
Mars is attended by 2 satellites, Jupiter by 4, Saturn by 8, Uranus by 4, Neptune by 1.

Abbreviations adopted in the Admiralty Charts, with Explanatory Notes.

Quality of the Bottom.

b.	*blue.*
blk.	*black.*
br.	*brown.*
brk.	*broken.*
c.	*coarse.*
cl.	*clay.*
crl.	*coral.*
d.	*dark.*
f.	*fine.*
g.	*gravel.*
gn.	*green.*
grd.	*ground.*
gy.	*gray.*
h.	*hard.*
m.	*mud.*
oys.	*oysters.*
oz.	*ooze.*
peb.	*pebbles.*
r.	*rock.*
rot.	*rotten.*
s.	*sand.*
sft.	*soft.*
sh.	*shells.*
spk.	*speckled.*
st.	*stones.*
stf.	*stiff.*
w.	*white.*
wd.	*weed.*
y.	*yellow.*

General Abbreviations.

Alt.	*Altitude.*
Anᶜʰᵍᵉ	*Anchorage.*
B.	*Bay.*
B. (near a buoy.)	*Black.*
Batʸ	*Battery.*
Bk	*Bank.*
C.	*Cape.*
C.G.	*Coast Guard.*
Cath.	*Cathedral.*
Ch.	*Church.*
Chan.	*Channel.*
Cheq. (near a buoy.)	*Chequered.*
Colᵈ	*Coloured.*
Cr.	*Creek.*
E.D.	*Existence doubtful.*
Flᵍ Lᵗ	*Floating Light.*
Fms.	*Fathoms.*
Ft.	*Feet or foot.*
G.	*Gulf.*
Gᵗ	*Great.*
H.	*Hour.*
Hᵈ	*Head.*
Ho.	*House.*
Hʳ	*Harbour.*
H.S. (near a buoy.)	*Horizontal Stripes.*
H.W.	*High Water.*
H.W.F. & C.	*High Water Full and Change.*
I.	*Island.*
Iˢ	*Islands.*
Kn.	*Knots.*
L.	*Lake.*
Lat.	*Latitude.*
Long.	*Longitude.*
Lᵗ	*Light.*
Lᵗ F.	*Light, Fixed.*
Lᵗ Fl.	„ *Flashing.*
Lᵗ Int.	„ *Intermittent.*
Lᵗ Occ.	„ *Occulting.*
Lᵗ Rev.	„ *Revolving.*
L.W.	*Low Water.*
Magz.	*Magazine.*
Magᶜ.	*Magnetic.*
Min. (near a light.)	*Minutes.*
Mᵗ	*Mountain.*
Np.	*Neaps.*
Obsⁿ Spot	*Observation Spot* +
P.	*Port.*
P.D.	*Position doubtful.*
Pᵏ	*Peak.*
Pᵗ	*Point.*
R.	*River.*
R. (near a buoy.)	*Red.*
Rᶠ	*Reef.*
Rᵏ	*Rock.*
Sᵈ	*Sound.*
Sec. (near a light.)	*Seconds.*
Sh.	*Shoal.*
Sp.	*Springs.*
Str.	*Strait.*
Tel.	*Telegraph.*
Varⁿ	*Variation.*
Vil.	*Village.*
Vis. (near a light.)	*Visible.*
V.S.	*Vertical Stripes.*
W. (near a buoy.)	*White.*
W.Pl.	*Watering Place.*

TABLE 49.

Table of Secondary Meridians

(from Greenwich), on which the Admiralty Charts now, and for the present, will continue to depend, with the district for the several meridians employed.

SHORES OF ATLANTIC OCEAN, AND NEIGHBOURING SEAS.

Copenhagen (*Observatory*)	12	34	48″	E.	Kattegat, Coasts of Norway ; Sweden.
St. Petersburg (*Pulkowa Observatory*)	30	19	40	E.	Baltic, White, and Black Seas.
Paris (*Observatory*)	2	20	9	E.	Coasts of France, West Coast of Italy; Algeria.
Cadiz (*St. Fernando Observatory*)	6	12	24	W.	Coasts of Spain and Portugal.
Malta (*Spencer's Monument*)	14	30	40	E.	West Coasts of Italy, Greece, Sicily; North Coast of Africa.
Alexandria (*Lighthouse*)	29	51	40	E.	Egypt and Syria.
Milo (*Summit of Mount Elias*)	24	23	8	E.	Grecian Archipelago.
Smyrna (*Mill on Daragaz Point*)	27	9	42	E.	„ „
Constantinople (*St. Sophia*)	28	58	59	E.	Black Sea.
Madeira, Funchal (*British Consul's House*)	16	54	30	W.	Azores, Canary and Cape de Verde Islands; West Coast of Africa to Fernando Po.
Newfoundland, St. John's (*Chain Rock Battery*)	52	40	47	W.	Newfoundland and Labrador.
Halifax, Nova Scotia (*Observatory Dockyard*)	63	35	21	W.	British North America and Canada.

Boston, United States (*Cambridge Observatory*)	71	7	39	W.	United States; North America
Havana (*Morro Lighthouse*)	82	21	30	W.	West Indies.
Port Royal, Jamaica (*Fort Charles*)	76	50	38	W.	West Indies.
St. Thomas (*Fort Christian*)	64	55	52	W.	West Indies.
Rio de Janeiro (*Fort Villegagnon*)	43	9	29	W.	East Coast of South America; Brazil.
Monte Video (*Rat Island*)	56	14	0	W.	East Coast of South America; Brazil.
Cape of Good Hope (*Government Observatory*)	18	28	40	E.	South Africa, Madagascar, Seychelles.

INDIAN OCEAN AND RED SEA.

Zanzibar (*British Consulate*)	39	11	8	E.	Adjacent African Coast.
Aden (*Telegraph Office*)	44	58	57	E.	Gulf of Aden.
Suez (*Port Ibrahim*)	32	33	30	E.	Red Sea.
Mauritius (*Martello Tower, Cooper I.*)	57	29	0	E.	Madagascar—African Coast.
Bombay (*Observatory*)	72	48	58	E.	Persian Gulf, West Coast of India and adjacent sea.
Madras (*Observatory*)	80	14	51	E.	Bay of Bengal.
Andaman Islands, Port Blair (*Chatham Island*)	92	43	0	E.	Andaman Islands.

JAVA, CHINA, AND JAPAN SEAS.

Batavia (*Observatory*)	106	48	37	E.	West Coast of Sumatra, Java Sea, Eastern Archipelago.
Singapore (*site of Fort Fullerton*)	103	51	15	E.	Malacca Strait, south part of China Sea, Palawan.
Manila (*Cathedral*)	120	58	6	E.	Philippine Islands.
Hong Kong (*Cathedral*)	114	9	31	E.	Coasts of China and Japan.
Shanghai (*British Consulate Flagstaff*)	121	28	55	E.	Yellow Sea and Korea.
Nagasaki (*Minage Point*)	129	51	13	E.	Japan.
Yokohama (*Flagstaff, English Victualling Depôt*)	139	39	13	E.	Japan.

AUSTRALIA, TASMANIA, AND NEW ZEALAND.

Sydney (*Fort Macquarie*)	151	13	0	E.	Australia and adjacent islands.
Moreton Bay (*Cape Moreton Lighthouse*)	153	28	0	E.	Queensland.
Cape York (*Sextant Rock*)	142	32	18	E.	Torres Strait and New Guinea.
Port Essington (*site of old Government House*)	132	9	18	E.	North-west Coast of Australia.
Swan River (*Scott's Jetty*)	115	44	30	E.	West Australia.
Adelaide (*Snapper Point*)	138	30	50	E.	South Australia.
Port Philip (*Melbourne Observatory*)	144	58	32	E.	Victoria.
Tasmania, Hobart (*Fort Mulgrave*)	147	20	35	E.	Tasmania.
New Zealand, Wellington (*Pipitea Point*)	174	47	53	E.	New Zealand.

PACIFIC OCEAN.

Levuka, Ovalau (*site of old Schoolhouse*)	178	51	0	E.	Fiji Islands, South-west Pacific Ocean.
Tahiti (*Point Venus Extreme*)	149	29	0	W.	South-east Pacific Ocean.
Honolulu (*King's Cottage*)	157	51	53	W.	North Pacific Ocean.
Esquimalt Harbour (*Duntze Head, site of Observatory*)	123	26	45	W.	Vancouver Island and British Columbia.
San Francisco (*Fort Point Lighthouse, south side of entrance*)	122	28	38	W.	California.
Panama (*North-east bastion*)	79	32	3	W.	Mexico and Ecuador.
Valparaiso (*site of Fort Antonio*)	71	38	42	W.	West Coast of South America.
Magellan Strait, Sandy Point (*boathouse*)	70	54	3	W.	Magellan Strait.

Meridians adopted in the construction of Foreign Charts.

Russia, Sweden, Denmark, Norway, Holland, Austria, and the United States of America adopt the meridian of Greenwich.

France adopts the meridian of Paris, assumed to be in long. 2° 20′ 9″ E. of Greenwich.

Spain adopts the meridian of San Fernando, Cadiz, assumed to be in long. 6° 12′ 24″ W. of Greenwich, or 5′ 22″ E. of Old Observatory.

Portugal adopts the meridian of the Observatory (Lisbon Castle), assumed to be in long. 9° 7′ 32″ W. of Greenwich.

The Pulkowa Observatory of St. Petersburg (sometimes referred to in Russian charts) is assumed to be in long. 30° 19′ 40″ E. of Greenwich.

The Royal Observatory of Naples (sometimes referred to in Italian charts) is assumed to be in long. 14° 15′ 7″ E. of Greenwich.

TABLE OF POSITIONS.

(TABLE 50.)

NOTE.—*At those places distinguished by an asterisk the position given is that of the lighthouse or light-vessel.*

CONTENTS.

SECT.		PAGE
I.	North America, East Coast from North to South	522
II.	North America, West Coast from North to South	524
III.	West India Islands	525
IV.	South America, East Coast from North to South	527
V.	South America, West Coast from South to North	527
VI.	Islands in Atlantic Ocean	528
VII.	Europe, Atlantic Coasts, including Great Britain and Ireland	529
VIII.	Mediterranean, Adriatic, and Black Seas, proceeding East on North side and West on South side	532
IX.	Africa, West Coast from North to South	535
X.	Africa, East Coast from South to North	536
XI.	Islands in Indian Ocean	537
XII.	Asia, South Coast from West to East	537
XIII.	Asia, East Coast from South to North	539
XIV.	Islands in North Pacific Ocean	541
XV.	Islands in South Pacific Ocean	543
XVI.	Australia, Tasmania, and New Zealand	546
XVII.	Arctic regions, Greenland, and Iceland	548

I. EAST COAST OF NORTH AMERICA.

Places.	Lat. N.			Long. W.		
LABRADOR.	°	′	″	°	′	″
Salisbury I., E. point	63	27	0	76	40	0
Nottingham I., S. point	63	10	0	78	4	0
Digges I., W. extreme	62	37	0	78	35	0
Cape Wostenholme	62	30	0	77	50	0
Charles I., E. point	62	44	0	74	18	0
Charles I., W. point	62	50	0	75	0	0
Cape Weggs	62	30	0	74	8	0
Prince of Wales Sound	62	0	0	72	8	0
Cape of Hope's Advance	61	20	0	70	10	0
Apatok I., E. point	60	10	0	67	5	0
Green I., N.E. point	61	2	0	67	25	0
Button I., N.E. point	60	45	0	64	53	0
CAPE CHIDLEIGH	60	25	0	65	0	0
Resolution I., S. point	61	21	0	64	54	0
Resolution I., E. point	61	30	0	64	30	0
Black Head	60	0	0	64	28	0
Eclipse Harbour, E. entr. point	59	48	0	64	7	15
Nachvack Bay, Is. off entrance	59	0	0	63	36	0
Saddle I.	57	45	0	62	38	0
Port Manvers, entrance	57	0	0	62	7	0
Nain, obs. spot	56	32	51	61	40	41
HOPEDALE HARBOUR, obs. spot	55	27	6	60	11	40
LABRADOR—*continued.*						
Aillick Harbour, obs. spot	55	9	0	59	5	0
Cape Harrison, N. extreme	54	55	50	57	56	30
Indian Harbour, obs. spot	54	26	55	57	12	40
Outer Gannet I., summit	54	0	5	56	31	48
Gready Harbour	53	50	0	56	23	0
Cartwright Har., Caribou Castle	53	42	36	56	59	40
Indian Tickle, obs. spot	53	34	20	56	0	0
Round Hill I., summit	53	26	10	55	36	5
Occasional Harbour, E. summit of Twin I.	52	40	8	55	44	19
CAPE ST. LEWIS, S.E. point	52	21	16	55	38	25
Battle Is., N.E. extr. of S.E. I.	52	15	36	55	32	20
Table Head	52	6	0	55	43	0
BELLE ISLE *	51	53	0	55	22	15
NEWFOUNDLAND.						
Cape Bauld, N. extreme	51	38	48	55	25	3
Bell I., S. end	50	42	10	55	35	30
Cape St. John, Gull I. summit	49	59	54	55	21	33
Funk I., summit	49	45	29	53	10	49
Offer Wadham *	49	35	40	53	45	0
Toulinguet Is., E. side of W. I.	49	39	30	54	46	12

I. East Coast of North America—*continued.*

Places.	Lat. N.			Long. W.		
Newfoundland—*continued.*	°	′	″	°	′	″
Seldom-come-by Harb., Shiphill	49	36	50	54	12	0
Cape Freels, Gull I.	49	15	20	53	25	12
Greenspond I.	49	4	20	53	37	45
Cape Bonavista *	48	42	1	53	4	35
Catalina Harbour, Green I.*	48	30	10	53	2	45
Bonaventure Head	48	16	55	53	23	35
HEART'S CONTENT, Episcopal Church	47	52	35	53	22	21
Baccalieu I.*	48	8	58	52	47	32
Harbour Grace *	47	41	25	53	12	30
Cape St. Francis, N.W. extreme	47	48	30	52	48	0
ST. JOHN'S HARBOUR, Chain Rock Battery	47	34	2	52	40	47
Cape Race *	46	39	24	53	4	20
Cape Pine *	46	37	5	53	31	40
Trepassy Harbour, Shingle Neck	46	43	20	53	22	10
Cape St. Mary *	46	49	30	54	11	30
Little Placentia Harbour, W.-side Cooper's Cove, obs. spot.	47	17	55	53	58	35
Burin Harbour *	47	0	25	55	8	40
Laun, Gr. Laun R. C. Ch.	46	56	30	55	32	0
ST. PIERRE, U.S. C. Surv. St.	46	46	51	56	10	36
Brunet I.*	47	15	30	55	51	40
Burgeo Is., summit Eclipse I.	47	36	12	57	36	52
La Poile Bay, Gr. Espic Church	47	39	50	58	24	10
CAPE RAY, S. extreme	47	37	2	59	18	15
Cod Roy I., S. side Boat Harbor	47	52	30	59	23	40
Cape St. George, Red I., S.E. pt.	48	33	48	59	13	10
Cow Head, N.W. extreme	49	55	20	57	50	0
Port Saunders, N.E. pt. of entry	50	38	30	57	18	0
Rich Point, W. extreme	50	41	39	57	24	20
Ferrolle Pt., Cove Pt., N.E. extr.	51	2	10	57	2	40
Flower Cove, Capstan Point	51	18	10	56	44	30
Green I., 150 fms. from N.E. end	51	24	10	56	33	40
CAPE NORMAN, extreme	51	38	0	55	53	12
Labrador.						
Chateau Bay, S. point, Castle I.	51	58	0	55	51	0
Amour Point *	51	27	35	56	50	53
Wood I., S. point	51	28	0	57	8	0
Greenly I.*	51	22	35	57	10	50
Bradore Hills, summit	51	34	0	57	12	0
Old Fort I.	51	22	0	57	47	0
Great Mecatina I., S.E. point	50	44	0	58	53	0
MECATINA HARBOUR, S. point of Dead Cove.	50	46	44	58	59	20
Little Mecatina I., S. point	50	31	0	59	21	0
St. Mary Rocks, S. point	50	13	0	59	45	0
South Maker's Ledge	50	9	0	59	58	0
R. and G. of St. Lawrence.						
Cape Whittle	50	11	0	60	8	0
Natashquan Point, S. edge	50	6	0	61	44	0
Clearwater Point, S.W. extreme	50	12	27	63	27	3
Carousel I.*	50	5	40	66	22	40
Point de Monts *	49	19	35	67	21	55
QUEBEC, N.E. bastion, citadel	46	48	30	71	12	25
MONTREAL, cathedral	45	30	24	73	33	4
FATHER POINT *	48	31	25	68	27	18
Cape Chattie, extreme	49	6	0	66	46	0
Cape Magdalen *	49	15	40	65	19	30
Cape Rosier *	48	51	37	64	12	0
Cape Gaspé *	48	45	15	64	9	15
ANTICOSTI I.*	49	5	20	61	41	48
Southwest Point *	49	23	50	63	36	0
New Brunswick, &c.						
Bonaventure I., E. point	48	29	0	64	10	0
Leander Shoal	48	25	0	64	18	0

Places.	Lat. N.			Long. W.		
New Brunswick—*continued.*	°	′	″	°	′	″
Macquereau Point	48	12	0	64	48	0
Chaleur Bay, Carlisle	48	1	0	65	16	0
Chaleur Bay, Dalhousie I.	48	4	24	66	22	10
Miscow I., N.E. point	48	1	0	64	31	0
Mirimichi Bay, Portage I., N. pt.	47	14	0	65	2	0
Point Escumenac *	47	5	0	64	46	0
PRINCE EDWARD I., N. point *	47	3	46	63	59	19
Richmond Harbour, Royalty Pt.	46	34	0	63	43	0
East Point *	46	27	9	61	58	15
CHARLOTTETOWN, flag-staff on fort.	46	13	55	63	6	53
Magdalen Is., North Bird Rock	47	50	57	61	9	15
Magdalen Is., Entry I.. *	47	16	30	61	42	0
St. Paul I., N.E.*	47	13	50	60	8	20
St. Paul I., S.W.*	47	11	20	60	9	36
Cape Breton Island.						
CAPE BRETON I., Cape N.	47	3	0	60	25	0
St. Ann's Harbour, E. pt. entr.	46	21	0	60	27	0
Sydney Harbour *	46	16	12	60	7	22
Scatary I.*	46	2	0	59	41	0
Louisburg *	45	54	34	59	57	15
Cape Hitchinbroke	45	34	0	60	42	0
Madame I., S. point	45	28	0	61	3	0
Port Hood, Just-au-corps I.	46	0	0	61	36	0
SABLE I.*	43	58	30	59	46	0
Nova Scotia.						
Pictou, custom-house	45	40	50	62	42	10
Cape St. George	45	52	0	61	52	0
Gut of Canso, N.W. entrance *	45	41	50	61	29	30
Arichat Harb., R.C. Ch. steeple	45	30	48	61	1	47
Cape Canso *	45	19	49	60	55	29
White Head I.*	45	12	0	61	8	0
Country Harbour, Green I.	45	6	0	61	32	9
Wedge I.	45	0	0	61	53	0
HALIFAX, dockyard obs.	44	39	38	63	35	21
Sambro I.*	44	26	11	63	33	30
Margaret's Bay, Shut-In I.	44	34	0	63	54	0
Tancook I.	44	29	0	64	6	0
Cape Le Havre, Black Rock	44	12	0	64	18	0
Coffin I.*	44	3	0	64	36	0
Little Hope I.	43	49	0	64	45	0
Shelburne Harbour *	43	37	30	65	16	0
Cape Sable *	43	23	19	65	37	11
Seal I.*	43	24	0	65	58	0
Cape Fourchu *	43	47	0	66	10	0
Cape St. Mary	44	7	0	66	11	0
Bryer's I.*	44	16	0	66	22	0
ANNAPOLIS, Prim Point	44	31	34	65	47	20
Haute I.	45	15	5	65	0	0
Cape Chignecto	45	19	0	64	58	0
New Brunswick.						
Cape Enragé *	45	36	0	64	29	0
Quaco *	45	23	0	65	20	0
ST. JOHN'S, Reed's Pt. time-ball	45	15	45	66	3	45
Cape Lepreau *	45	3	42	66	27	0
Etang Harbour, S. pt. tower.	44	4	0	66	49	0
St. Andrew's *	45	4	20	67	3	0
Campo Bello I.*	44	57	0	66	55	0
Grand Manan I.*	44	45	52	66	44	0
Gannet Rock *	44	30	38	66	47	1
Machias I.*	44	30	7	67	6	13

I. East Coast of North America—*continued.*

Places.	Lat. N.			Long. W.		
United States.	°	′	″	°	′	″
PORTLAND, Custom-house	43	39	28	70	15	18
PORTSMOUTH, Navy-yd. f.-s.	43	4	56	70	44	22
CAMBRIDGE, Harvard Obs.	42	22	48	71	7	43
BOSTON, Navy-yard flag-staff	42	22	22	71	3	5
NEWPORT, f.-s., torpedo st.	41	29	7	71	19	40
NEW HAVEN, Yale College spire (middle)	41	18	28	72	55	45
ALBANY, Dudley Obs.	42	39	50	73	44	56
NEW YORK, Navy-yd. f.-s.	40	42	2	73	58	51
Sandy Hook *	40	27	40	74	0	9
PHILADELPHIA, PA., Navy-yard flag-staff	39	53	14	75	10	32
WILMINGTON, Town-hall	39	44	27	75	33	3
BALTIMORE, Washington Monument	39	17	48	76	36	59
ANNAPOLIS, Naval Acad. obs.	38	58	53	76	29	8
WASHINTON, D.C., Naval obs.	38	53	39	77	3	8
NORFOLK, Navy-yard f.-s.	36	49	33	76	17	46
SAVANNAH, Exchange spire	32	4	52	81	5	26
Campechá, Cathedral	19	50	45	90	33	51
Half-Moon Cay *	17	12	12	87	32	15
Dulce River, entrance W. side	15	49	45	88	46	23
TRUXILLO, Fort	15	55	45	85	59	18
Bonacca L., summit	16	28	0	85	55	0
KEY WEST *	24	32	58	81	48	4
Tortugas, Loggerhead Key *	24	38	4	82	55	43
PENSACOLA *	30	20	47	87	18	32
MOBILE, Episcopal Church	30	41	26	88	2	28
NEW ORLEANS, U.S. mint	29	57	46	90	3	28
GALVESTON, cath., N. spire	29	18	17	94	47	26
Mexico, &c.						
Tampico *	22	15	50	97	49	0
MEXICO, National obs.	19	26	1	99	6	39
Vera Cruz, San Juan d'Ulloa *	19	12	0	96	7	57
Tuxlta, volcano, summit	18	29	0	95	8	0
Cape Camaron	16	0	0	85	3	0
Cape Gracias-a-Dios, extreme	14	59	0	83	10	27
Caxones Reef, Gt. Hobby Islet	16	3	30	83	8	21
Gorda Bank, Gorda Cay	15	52	0	82	23	27
Half-Moon Cay, centre	15	8	50	82	42	9
Old Providence, Isabel House	13	22	54	81	22	6
Blewfield, Schooner Point	11	59	0	83	41	57
San Juan de Nicaragua, church	10	55	14	83	42	5

II. West Coast of North America.

Alaska.						
POINT BARROW, highest lat. of U.S.	71	27	0	156	15	0
Mount St. Elias, summit	60	20	45	141	0	12
SITKA, mid. of parade ground	57	2	52	135	19	31
North I., N. point	54	20	0	133	0	0
Vancouver Island, &c.						
Hecate Bay, Obs. Islet	49	15	22	125	56	17
Nootka Sound, Friendly Cove	49	35	31	126	37	32
Cook Cape, Solander I.	50	6	31	127	57	20
North Harbour, Obs. Rock	50	29	25	128	3	39
Koprino Harbour, Obs. Rock	50	30	0	127	52	16
Hecate Cove, Kitten Islet	50	32	36	127	36	18
Triangle I., W. side	50	51	53	129	6	32
Cape Scott, summit	50	46	41	128	26	45
Bull Harbour, Hope I., N. pt., Indian I.	50	54	47	127	56	3
Port Alexander, islet in centre	50	50	49	127	39	57
BEAVER HARB., Shell Islet	50	42	36	127	25	7
British Columbia.						
Cormorant I., Yellow Bluff in Alert Bay	50	35	2	126	57	30
Baynes Sound, Beak Point	49	36	29	124	51	18
Nanoose Harb., Entrance Rock	49	15	43	124	8	6
Atkinson Point *	49	19	40	123	16	0
Nanaimo *	49	12	50	123	48	45
Nanaimo, Benson's House	49	10	15	123	56	36
VICTORIA, Laurel Point	48	25	22	123	23	2
Victoria *	48	25	20	123	24	0
ESQUIMAULT, Duntz Head	48	25	49	123	26	45
Esquimault *	48	25	40	123	27	20
Race I *	48	17	30	123	32	15
Sook Inlet, Secretary I.	48	19	35	123	42	40
Port San Juan, Pinnacle Rock	48	33	30	124	27	37
Port Harvey, Tide Pole Islet	50	33	58	126	16	40
Port Neville, Robber's Nob	50	31	9	126	4	21
Knox Bay, Thurlow I., stream at head of bay	50	24	15	125	39	0
Valdes I., S. point	50	2	42	125	14	38
Howe Sound, Plumper Cove	49	24	39	123	29	20
Burrard Inlet, Government Reserve, English Bay	49	16	18	123	12	0
B. Columbia—*continued.*						
Fraser River, Garry Point	49	7	4	123	12	1
NEW WESTMINSTER, Military barracks	49	13	1	122	54	26
Point Roberts, Parallel station	49	0	0	123	5	26
Semiahmoo Bay, Parallel stn.	49	0	0	122	45	30
Admiralty Head *	48	9	16	122	40	34
New Dungeness *	48	10	52	123	6	31
CAPE FLATTERY *	48	23	20	124	44	30
Astoria, flag-staff	46	11	19	123	49	42
Cape Blanco *	42	50	7	124	33	0
California, &c.						
Cape Mendocino *	40	26	21	124	24	14
SAN FRANCISCO, Coast Survey ast. stn.	37	47	55	122	24	32
Mare I., stone block, obs. stn.	38	5	53	122	16	16
Benicia, church	38	3	5	122	9	23
Farallon Islet *	37	41	49	123	0	4
Mount Hamilton, obs. peak	37	21	3	121	36	40
Pigeon Point *	37	10	46	122	23	36
Santa Cruz, Warehouse f.-s.	36	57	31	122	1	29
Monterey, C. S. azimuth stn.	36	35	21	121	52	59
Point Pinos *	36	37	52	121	55	59
Point Conception *	34	26	50	120	28	6
Santa Barbara, N. tower, Mission Church	34	26	10	119	42	42
Point Firmino, San Pedro Bay *	33	42(19)		118	17(37)	
Point Loma *	32	40	14	117	14	36
SAN DIEGO, C. S. ast. stn.	32	43	6	117	9	40
Mexican Boundary, obelisk	32	31	58	117	7	32
San Miguel I., Seal Point	34	4	19	120	21	55
Santa Rosa I., E. point	33	56	30	119	58	29
Santa Cruz I., N.E. point	34	3	12	119	33	51
Alijos Rocks, summit	24	58	6	115	44	47
Cape San Lazaro, extreme	24	47	35	112	18	30
San Lucas, beach in N.W. part of bay	22	53	21	109	54	41
Pichilinque Bay, S.E. part of San Juan, Nepomezeine I.	24	15	31	110	20	34
La Paz, Peninsula of El Mogote	24	10	10	110	20	41
Pulpito Point, summit	26	30	44	111	27	14

II. West Coast of North America—*continued.*

Places.	Lat. N.	Long. W.
Mexico.	° ′ ″	° ′ ″
Tiburon I., S.E. end	28 45 55	112 21 46
GUAYMAS, signal station	27 55 53	110 55 13
MAZATLAN, signal station	23 11 17	106 26 39
San Blas, Custom-house	21 32 30	105 18 40
Maria Madre I., S.E. extreme	21 30 45	106 33 14
Socorro I., S.E. part	18 42 57	110 56 53
Roca Partida, summit	18 57 27	112 11 6
Clarion I., S. end	18 20 55	114 44 17
Clipperton I., summit	10 17 0	109 10 0
Navidad Bay, Beach, N. of Harbour Point	19 12 59	104 21 27
Manzanilla Bay, W. end of village beach	19 3 18	104 17 41
ACAPULCO, N.W. angle of ft.	16 50 56	99 55 28
Port Guatulco, Cross	15 44 58	96 8 10
Central America.		
San José de Guatemala, near head of pier	13 55 19	90 49 53

Places.	Lat. N.	Long. W.
C. America—*continued.*	° ′ ″	° ′ ″
Acajutla, Custom-house	13 34 17	89 50 21
Libertad, inshore end of iron wharf	13 29 1	89 19 28
La Union, U.S. Consulate	13 20 6	87 51 0
Realejo (Corinto) *	12 27 55	87 7 47
Port Nuevo, Entrada Point	8 4 30	81 42 30
Bahia Honda, W. end of Sentinela I.	7 48 32	81 29 1
Coiba (Quibo) I., Observation point	7 24 20	81 40 55
Cocos Island, head of Chatham Bay	5 32 57	86 58 22
PANAMA, S. tower of cath.	8 57 6	79 32 12
Panama, N.E. bastion, astron. station	8 57 12·3	79 32 5
Taboga I., Church	8 37 10	79 3 10
Cape Mala, extreme	7 27 40	79 58 30
Malpelo I., summit	4 3 0	81 36 0

III. West India Islands.

Bahama Islands.		
Memory Rock, centre	26 56 53	79 6 54
BAHAMA I., W. point	26 41 18	79 0 38
Abaco I.*	26 51 30	77 11 9
Little Guano Cay*	26 31 10	76 58 0
Walker's Cay, highest part	27 15 42	78 23 48
Great Isaac Cay *	26 2 0	79 6 30
Gun Cay *	25 34 30	79 18 48
Ginger Cay, centre	22 44 50	78 6 30
Cay Lobos *	22 22 50	77 35 9
St. Domingo Cay, centre	21 42 0	75 45 9
Cay Verde, hill at S. end	22 1 15	75 10 34
Ragged I., Gun Point	22 14 2	75 45 17
Nairn Cay, E. point	22 20 44	75 28 20
Nurse Channel Cay, beacon	22 31 15	75 51 41
Long I., S. point	22 51 0	74 51 54
Great Emma I., beacon	23 32 15	75 46 24
Clarence Harbour, Lochaber f.-s.	23 5 45	74 59 0
Eleuthera I., Pigeon Cay	25 11 15	76 15 17
Eleuthera I., Cow and Bull	25 26 15	76 37 8
Royal I., Eastern Pass	25 31 20	76 51 48
NASSAU *	25 5 37	77 22 22
Andros I., High Cay	24 39 30	77 42 30
Andros I., N. extreme	25 10 40	78 1 36
Great Stirrup Cay, flag-staff	25 49 45	77 54 46
Little Stirrup Cay, W. end	25 49 12	77 57 6
San Salvador, N.W. point	24 41 10	75 46 24
Concepcion I., W. bay	23 50 50	75 7 27
Watlings I., Hunchinbroke Rk.	23 56 40	74 28 34
Rum Cay, Harbour Point	23 37 45	74 50 8
Castle I.*	22 6 40	74 20 40
Fortune I., S. end	22 32 40	74 22 54
Crooked I., Moss flag-staff	22 47 30	74 20 24
Bird I.*	22 51 0	74 22 51
Samana Cay, W. point	23 5 30	73 49 33
Plana Cay, N.W. point	22 34 38	73 38 3
Mariguana I., S.E. point	22 16 30	72 47 3
Hogsty Reef, N.W. Cay	21 40 30	73 51 3
INAGUA I.*	20 56 0	73 40 45
Inagua I., N.W. point	21 7 10	73 40 21
Little Inagua I., N.W. point	21 30 40	73 42 33
W. Caicos Cay, Hill, S.E. end	21 37 30	72 28 33
French Cay, W. point	21 30 0	72 12 51
Fort George Cay, Old magazine	21 54 0	72 7 14
Caicos I., Parsons Point, S. islet	21 29 33	71 31 30
Turks I.*	21 31 0	71 7 40
Square Handkerchief Bank, N.E. breaker	21 7 0	70 30 0

Bahama Is.—*continued.*		
Silver Bank, E. extreme	20 35 0	69 21 0
Navidad Bank, centre of E. side	20 2 0	68 47 0
Cuba.		
Cape Maysi *	20 15 10	74 42 9
Port Baracoa *	20 21 0	74 27 48
Port Cayo Moa, Carenero Point	20 41 41	74 52 18
Port Nipe, Roma Point	20 47 14	75 33 18
Lucrecia Point *	21 4 38	75 37 13
Port Sama, E. side of entrance	21 9 0	75 47 18
Peak of Samma, summit	21 7 0	75 47 40
Port Naranjo, E. side of entrance	21 7 30	75 52 18
Port Padre, Guinchos Point	21 18 30	76 35 34
Port Nuevitas *	21 37 30	77 4 34
Maternillas Point *	21 40 6	77 8 15
Cay Verde, N.W. end	22 8 45	77 37 33
Cay Confites, S. point	22 11 14	77 39 23
Paredon Grande Cay *	22 29 3	78 9 11
Cay Sal *	23 56 30	80 27 48
Bahia de Cadis Cay *	23 13 0	80 29 18
Cay de Piedras *	23 14 42	81 7 35
Peak of Matanzas	23 1 54	81 43 18
HAVANA, Morro *	23 9 21	82 21 30
Havana, transit pier, arsenal yd.	23 8 3	82 21 17
Colorado Reefs, W. end	22 9 0	84 47 18
Cape San Antonio *	21 51 30	84 57 22
San Felipe Cays, S.W. point	21 55 0	83 31 18
Isle of Pines, Point Frances	21 37 15	83 11 52
Piedras Cay *	21 58 0	81 2 18
Cienfuegos *	22 1 0	80 29 18
Pickle Bank, centre	20 23 0	80 30 0
Cape Cruz *	19 50 0	77 43 48
SANTIAGO DE CUBA, Blanca Battery	20 0 16	75 50 30
Port Guantanamo, E. pt. of entr.	19 55 0	75 15 18
Cayman Brac, S.W. point	19 40 35	79 54 59
Little Cayman, W. point	19 39 10	80 7 54
Grand Cayman, Fort George, W. end	19 17 45	81 23 54
Jamaica.		
Morant Point *	17 55 5	76 11 40
Port Antonio, fort flag-staff	18 11 15	76 26 51
Port Maria, N.W. wharf	18 23 0	76 54 54
St. Ann's Bay, long wharf	18 26 24	77 13 24
Falmouth, fort	18 30 34	77 40 24

III. West India Islands—*continued.*

Places.	Lat. N.	Long. W.
	° ′ ″	° ′ ″
Jamaica—*continued.*		
Montego Bay, fort	18 29 25	77 56 48
St. Lucia, fort	18 27 45	78 11 24
Savanna-le-Mer, fort	18 12 20	78 8 54
Kingston, Lord Rodney's statue	17 57 41	76 47 40
PORT ROYAL, Fort Charles, flag-staff	17 55 56	76 50 38
Morant Cays, N.E. Cay	17 26 30	75 58 20
Pedro Bank, Portland Rock, E. end	17 8 0	77 27 0
Baxo Nuevo, Sandy Cay	15 53 0	78 39 4
Haytl		
Cape Engano, extreme	18 35 51	68 20 40
Samana Town, fort	19 12 30	69 19 50
Cape Cabron, extreme	19 21 17	69 16 0
Port Plata, fort	19 48 34	70 42 6
Grange Point, W. end	19 54 45	71 39 8
Manzanilla Point, extreme	19 45 34	71 57 20
CAPE HAYTIEN HARBOUR, town fountain	19 46 40	72 10 42
Port Paix, wharf	19 57 40	72 48 54
Nicolas Mole, Fort George	19 49 30	73 22 34
Gonaïves, Verreur Point	19 25 42	72 42 52
Gonave I., W. point	18 55 26	73 18 34
Arcadius Is.*	18 47 50	72 38 15
Port au Prince, Fort Alexander	18 33 10	72 19 56
Petite Rivière Village, sand beach in front of huts	18 37 51	74 23 50
Jeremie, fort	18 38 15	74 5 54
Navassa I., N. extreme	18 25 10	75 2 8
Formigas Bank, shoal spot	18 33 0	75 44 0
Vache I., sand beach, near NW. point	18 6 0	73 43 40
JACMEL, wharf	18 13 30	72 33 39
Beata I., N.W. point	17 36 45	71 32 54
Frayle Rock, centre	17 37 0	71 41 0
Alta Vela, summit	17 28 50	71 39 11
Avarena Point, extreme	18 7 0	71 0 0
Salinas Point (Caldera), extreme	18 12 0	70 36 0
ST. DOMINGO CITY, British Consulate	18 28 12	69 52 0
Saona I., S.E. point	18 6 42	68 35 22
Point Espada, extreme	18 19 43	68 28 16
Mona I., W. point	18 4 0	67 56 16
Porto Rico.		
Mayaguez, Algarroba Point	18 14 22	67 12 0
Aguadilla Bay, village	18 25 20	67 11 0
San Juan de Porto Rico, Morro*	18 28 56	66 7 28
San Juan Head, summit	18 23 0	65 36 12
Cape Mala Pascua, extreme	17 59 0	65 49 12
Guanica, Meseta Point	17 57 44	66 58 0
Culebra I., Soldier Point	18 16 46	65 17 19
Vicques I., E. point	18 8 15	65 16 18
ST. THOMAS, Fort Christian, S.W. bastion	18 20 23	64 55 52
St. John I., Ram Head	18 18 8	64 42 3
Tortola, Fort Burt	18 25 4	64 36 47
Virgin Gorda, Vixen Point	18 30 39	64 21 48
Anegada, W. point	18 49 9	64 25 57
Anegada, E. extreme of reefs	18 36 30	64 11 0
CHRISTIANSTED, Santa Cruz, S.W. bastion of fort	17 45 9	64 41 17
Christiansted, Santa Cruz, Lang's Obs	17 44 43	64 41 17
Sombrero*	18 35 37	63 27 48
Dog I., centre	18 16 42	63 15 36
Anguilla, Custom-house	18 13 6	63 4 15
St. Martin, Fort Marigot	18 4 7	63 5 21

Places.	Lat. N.	Long. W.
	° ′ ″	° ′ ″
St. Bartholomew, Fort Oscar	17 53 58	62 51 6
Saba, Diamond Rock	17 39 10	63 14 57
St. Eustatius, fort flag-staff	17 29 10	62 58 50
St. Christopher, Basseterre Ch.	17 18 12	62 42 55
Booby I., centre	17 13 38	62 35 25
Nevis, Fort Charles	17 7 52	62 37 10
Barbuda, f.-s., martello tower	17 35 50	61 49 36
ANTIGUA, English Harbour, flag-staff, dock-yard	17 0 0	61 45 18
Antigua, Man-of-War Pt., extr.	17 3 22	61 39 44
Antigua Sand I.*	17 6 50	61 54 30
Antigua, St. John, cath. N. tr.	17 6 13	61 50 28
Redonda Islet, centre	16 55 18	62 18 53
Montserrat, Plymouth Wharf	16 42 12	62 13 0
Guadeloupe, Basseterre, f.-s.	15 59 50	61 43 32
Guadeloupe, Kahouane I., sumt.	16 22 4	61 46 22
GUADELOUPE, Port Louis, tower	16 25 7	61 31 34
Guadeloupe, Grand Terre, N. point	16 31 3	61 27 32
Guadelope, Le Moule, flag-staff	16 19 54	61 20 15
Guadeloupe, Gosier Islet*	16 11 57	61 29 3
Guadeloupe, Cochon Islet, f.-s.	16 12 54	61 31 44
Guadeloupe, Manroux I.*	16 13 14	61 31 28
Guadeloupe, Point à Pitre, Jarry Mill	16 13 56	61 32 38
Desirade, E. point	16 20 16	61 0 7
Petite Terre*	16 10 17	61 6 8
Marie Galante, Tower at Grand Bourg	15 53 3	61 18 30
Saintes Is., tower on Chameau Hill	15 51 32	61 35 18
Dominica, Prince Rupert's Bay, sand beach W. of church	15 34 34	61 27 39
DOMINICA ROSEAU, flag-staff, Fort Young	15 17 27	61 23 5
Aves I., centre	15 42 0	63 37 46
MARTINIQUE, Fort Royal, Fort St. Louis	14 36 7	61 4 0
Martinique, St. Pierre, upper light, Ste. Marthe Battery	14 43 54	61 11 12
Martinique, Caravelle Rock, summit	14 48 28	60 52 46
Martinique, Cabrit Islet, summit	14 23 32	60 52 3
St. Lucia, Port Castries, Tapion Battery	14 1 30	61 0 50
BARBADOES, Bridgetown, flag-staff, Rickett's Battery	13 5 42	59 37 18
Barbadoes, S. point*	13 2 55	59 31 20
Barbadoes, Ragged Point*	13 9 55	59 25 35
St. Vincent, Kingstown, Police yard	13 9 4	61 13 15
Becquia I., Admiralty Bay, N. point	13 5 0	61 14 0
GRENADA, Fort George f.-s.	12 3 2	61 44 55
Tobago, N. point	11 21 0	60 31 0
Tobago, Rocky Bay*	11 10 8	60 42 24
Testigos Islets, centre of Testigo Grande	11 25 2	63 5 30
Sola I., centre	11 19 0	63 36 0
Pampatar, Margarita I., San Carlos Castle	10 59 43	63 47 56
Tortugas I., S. end. of W. Tortugillo Islet	10 57 45	65 26 42
Orchila, S. side	11 47 57	66 12 39
Roques Is., Pirate Cay	11 55 56	66 39 41
Bonaive I.*	12 2 6	68 14 10
Little Curacoa I.*	11 58 0	68 39 32
CURACOA I.*	12 6 45	68 57 6
Oruba I.*	12 31 5	70 2 34

IV. North and East Coasts of South America.

Places.	Lat. N.	Long. W.
	° ′ ″	° ′ ″
ASPINWALL *	9 22 9	79 54 45
Porto Bello, Fort St. Jeronymo.	9 32 30	79 38 30
Cartagena, Fort Postellilo	10 25 5	75 32 25
Savanilla *	11 0 15	74 57 55
Magdalena River, N.W. point of Gomez I.	10 7 0	74 49 51
Santa Marta, ruined battery N. of cathedral	11 15 18	74 13 36
Cape La Vela, sand beach inside cape	12 12 34	72 9 42
Bahia Honda, E. point, S. side	12 23 9	71 45 42
Venezuela, &c.		
MARACAYBO, Zapara I.*	10 58 0	71 40 0
St. Juan Bay, Cay	11 10 0	68 27 55
Puerto Cabello, Obs. bastion	10 29 22	68 0 58
La Guayra, bastion of San Fernando	10 36 49	66 56 43
Caracas, La Villa de, summit	10 32 30	66 50 55
Cape Codera, Morro	10 35 0	66 6 15
Centinella Islet, centre	10 49 30	66 9 25
Barcelona, Morro	10 13 30	64 44 0
CUMANA, Fort Boca	10 28 0	64 11 4
Escarseo Point, extreme	10 40 0	64 17 55
Chacopata, Morro	10 42 0	63 50 25
Esmeralda Islet, centre	10 40 0	63 31 55
Puerto Santo Islet, centre	10 43 0	63 10 55
Tres Puntas Cape, extreme	10 45 0	62 41 55
Unare Bay, Obs. spot, 200 yards S. of Morro	10 44 19	62 44 7
Pena Point, extreme	10 48 48	61 50 50
Pato I., E. point	10 38 15	61 51 18
TRINIDAD I., Port Spain, flag-staff, water battery	10 38 39	61 30 28
Trinidad I., Chacachacare I., rocks off S. W. point	10 40 3	61 45 54
Trinidad I., Chute d'Eau I., cen.	10 46 0	61 30 45
Trinidad I., Mount Maracas, summit	10 44 0	61 24 41
Trinidad, Galera Pt., extreme	10 50 0	60 54 0
Trinidad, Icacos Pt.*	10 3 0	61 55 50
Trinidad, San Fernando, pier hd.	10 16 59	61 28 22
Macomoco Point, extreme	8 39 25	60 10 15
DEMARARA, Georgetown *	6 49 20	58 11 30
Paramaribo, time-ball	5 49 30	55 12 54
Cayenne, landing-place	4 56 20	52 20 8
Brazil.		
Orange Cape, extreme	4 20 45	51 27 46
North Cape, extreme	1 40 17	49 56 46
	Lat. S.	
PARA, custom-house	1 26 59	48 30 1
Maranham I., landing-place	2 31 48	44 17 34
Cape St. Roque, extreme	5 29 15	35 15 31
Rio Grande do Norte *	5 45 5	35 11 34
Olinda, steeple	8 0 35	34 51 17
PERNAMBUCO, Picaõ *	8 3 22	34 51 56
Cape St. Augustine, extreme	8 29 45	34 56 16
Maceio *	9 39 35	35 45 1
San Francisco River *	10 29 0	36 21 55

Places.	Lat. S.	Long. W.
	′ ″ °	′ ″ °
BAHIA, Cape St. Antonio *	13 0 37	38 32 5
Ilheos, church	14 47 40	39 3 26
Porto Segura, Matriz Church	16 25 38	39 4 16
Abrolhos I.*	17 57 31	38 41 47
Cape St. Thomé, extreme	22 0 0	40 58 46
CAPE FRIO *	23 0 42	42 0 1
Maricas I., S. islet	23 1 43	42 54 6
RIO DE JANEIRO, Fort Villegagnon flag-staff	22 54 46	43 9 29
Rio de Janeiro, Raza I.*	23 3 40	43 8 44
Ilha Grande, summit	23 8 34	44 14 11
Saint Sebastian I., S.E. point	23 58 30	45 15 46
Santos, Moela I.*	24 3 6	46 16 0
St. Catherine I., Rapa Point	27 22 55	48 26 11
St. Catherine I., Naufragados *	27 49 30	48 35 17
Nostra Senhora do Deserto, Quay	27 36 0	48 34 16
Cape St. Martha, extreme	28 38 0	48 49 50
Rio Grande do Sul *	32 6 40	52 7 36
Uruguay.		
Castillos, Buena Vista Hill	34 21 19	53 46 48
Cape Santa Maria *	34 40 30	54 9 26
Lobos I., centre	35 1 39	54 52 48
Maldonado *	34 58 15	54 56 42
Flores I.*	34 56 55	55 54 36
MONTE VIDEO, cathedral, S.E. tower	34 54 33	56 12 15
Colonia *	34 28 20	57 51 56
Martin Garcia I., centre	34 11 10	58 15 12
BUENOS AYRES, cupola of custom-house	34 36 30	58 22 14
Indio Point, extreme	35 15 20	57 10 19
Piedras Point, extreme	35 26 50	57 5 28
Cape San Antonio, N. extreme	36 18 30	56 46 8
Patagonia.		
Port Madryn, anch. off cave bluff	42 45 40	64 59 0
Chupat River, entrance	43 20 45	65 3 9
Cape Three Points, N.E. pitch.	47 6 20	65 51 19
Port San Julian, Sholl Point	49 15 20	67 42 30
Gallegos River, obs. mound	51 33 21	69 0 31
CAPE VIRGINS	52 20 10	68 20 50
Tierra del Fuego.		
Cape St. Diego, extreme	54 40 35	65 5 53
Cape St. John, Staten Land, E. extreme	54 42 50	63 43 25
Port Cork, Staten Land, obs. mark, summit	54 45 16	64 3 0
Cape St. Bartholomew, Staten Land, middle point	54 53 45	64 45 45
Good Success Bay, S. end of beach	54 48 6	65 14 0
Lennox Cove, Bluff, N. end of beach	55 17 0	66 49 0
Goree Road, Guanaco Point	55 19 0	67 10 0
Wallaston I., middle cove	55 35 30	67 19 0
Barneveldt Is., centre	55 48 54	66 43 48
CAPE HORN, south summit	55 58 41	67 16 15
Hermite I., St. Martin Cove	55 51 20	67 34 0

V. West Coast of South America.

Tierra del Fuego, Patagonia.	Lat. S.	Long. W.
False Cape Horn, S. extreme	55 43 15	68 4 40
Diego Ramirez I., highest sum.	56 28 50	68 41 30
York Minster Rock, summit	55 24 50	70 1 30
Cape Desolation, S. summit	54 45 40	71 36 10
Mount Skyring, summit	54 24 48	72 10 20
Landfall I., sum. of Cape Inman	53 18 30	74 18 15

	Lat. S.	Long. W.
Apostle Rocks, W. rocks	52 46 15	74 46 50
CAPE PILLAR, N. cliff	52 42 50	74 42 20
Magellan Straits.		
Dungeness Point, beacon	52 23 50	68 25 40
Sandy Point, block-house *	53 9 30	70 53 37

V. West Coast of South America—*continued.*

Places.	Lat. S.	Long. W.
Magellan Straits—*continued.*	° ′ ″	° ′ ″
Port Famine, Observatory	53 38 15	70 56 37
Cape Froward, summit of bluff	53 53 43	71 17 15
Port Gallant, Wigwam Point	53 41 45	71 59 41
Borgia Bay, bluff on W. shore	53 31 45	72 34 15
Swallow Bay, Shag I	53 30 5	72 47 30
Playa Parda Cove, s. of Shelter I.	53 18 45	73 0 30
Port Tamar, Mouat Islet	52 55 46	73 44 28
Port Grappler, obs. spot	49 25 19	74 17 39
Westminster Hall Islet, E. sum.	52 37 18	74 23 10
Evangelist I., Sugar Loaf	52 24 18	75 7 10
CAPE VICTORY, extreme	52 16 10	74 55 0
Cape Isabel, W. extreme	51 51 50	75 13 20
Cape Santiago, summit	50 42 0	75 27 45
Molyneux Sound, Romalo I.	50 17 20	74 51 30
Cape Tres Puntas, summit	50 2 0	75 22 0
Cape Tres Montes, extreme	46 58 57	75 25 30
Chile.		
VALDIVIA, Niebla Fort *	39 53 7	73 25 5
Lota, beach fronting village	37 5 15	73 10 40
Talcahuano *	36 36 45	73 3 25
Aconcagua Mountain, summit	33 38 30	69 56 30
Santiago, Observatory	33 26 42	70 40 36
VALPARAISO, site of Fort San Antonio	33 1 53	71 38 42
Valparaiso, Playa Aucha Pt.*	33 1 30	71 38 40
COQUIMBO, Tortuga Pt.*	29 56 15	71 21 5
Coquimbo, smelting works, north of town	29 56 24	71 20 11
Coquimbo, N. islet	29 55 10	71 21 10
Huasco, light on mole	28 27 30	71 15 45
Copiapo, landing-place	27 20 0	70 57 45
Caldera *	27 3 15	70 53 45

Places.	Lat. S.	Long. W.
Chile—*continued.*	° ′ ″	° ′ ″
Port Taltat, Taltal Point	25 24 55	70 35 10
Antofagasta, post-office	23 41 0	70 25 0
Port Cobija, landing-place	22 34 0	70 17 5
Peru.		
IQUIQUE *	20 12 30	70 11 20
Ylo, mouth of rivulet	17 37 0	71 19 45
Mollendo, flag-staff	17 1 0	72 2 0
Islay, custom-house	17 0 0	72 7 0
Pisco, cathedral	13 42 42	76 11 26
Chincha Is., boat-slip E. side N. I.	13 38 20	76 24 15
San Lorenzo I.*	12 4 0	77 15 44
CALLAO, arsenal	12 3 53	77 8 20
Pescadores Is., summit of largest	11 47 10	77 15 50
Lobos de Afuera I., cove on E. sd.	6 46 45	80 39 55
Lobos de Tierra I., central sum.	6 26 45	80 48 50
Aguja Point, W. cliff summit	5 55 30	81 6 0
Payta, Saddle, S. summit	5 12 0	81 5 20
Payta, N.W. end of village	5 5 36	81 6 25
Tumbez, Malpelo Point	3 30 42	80 28 12
Guayaquil River, Santa Clara I.*	3 10 45	80 24 31
Puna, Mandiuga Point *	2 44 30	79 52 50
Plata Isle, E. point	1 16 55	81 3 0
Cape San Lorenzo, Marlingspike Rock	1 3 30	80 55 0
	Lat. N.	
Cape San Francisco, S.W. extr.	0 40 0	80 7 0
Guascama Point, extreme	2 37 10	78 23 29
Gorgona I., Watering Bay	2 58 10	78 10 20
Cape Corrientes, S.W. extreme	5 28 46	77 32 33
Darien Harbour, Graham Pt.	8 28 50	78 4 40
Point Chamé, extreme	8 39 0	79 40 50

VI. Islands in the Atlantic Ocean.

Azores Islands, &c.	Lat. N.	Long. W.
Rockall Islet, summit	57 35 52	13 42 21
AZORES Is., Corvo I., S. pt.	39 40 7	31 8 0
Flores I., Santa Cruz Fort	39 27 0	31 8 49
Fayal Channel, N. Magdalen Rk.	38 32 9	28 34 0
Fayal I., Castle of Santa Cruz	38 31 45	28 38 54
Pico I., summit	38 25 0	28 28 12
St. George I., Topo Islet, off S.E. point	38 33 6	27 46 27
Terceira I.	38 38 33	27 14 10
St. Michael I., Custom-house, Ponte Delgada	37 44 15	25 41 9
St. Michael I., Point Arnel *	37 49 20	25 8 21
Santa Maria I., Villa do Porto	36 56 30	25 9 45
Formigas I., highest rock	37 16 44	24 47 6
Madeira Islands.		
Porto Santo I., Fort Baleira	33 3 30	16 20 44
Desertas, Chao I., Sail Rock	32 35 45	16 33 30
MADEIRA I., Funchal, flag-staff, Fort St. Jago	32 38 4	16 53 54
Madeira I., Fora Island *	32 43 14	16 39 30
Madeira I., Pico Ruivo, summit	32 45 0	16 57 30
Madeira I., British Consulate	32 38 22	16 54 30
Salvage I., Gran. Salvage I.*	30 7 39	15 51 8
Canary Islands.		
Allegranza I., Delgada Point *	29 23 48	13 29 36
Lanzarote I., Port Naos *	28 57 24	13 32 58
Lanzarote I., Pechinguera Pt.*	28 50 56	13 52 8
Lobos I., Martino Point *	28 45 25	13 49 4
Fuerta Ventura I., Jandia Pt.*	28 3 0	14 31 26

Canary Islands—*continued.*	Lat. N.	Long. W.
G. Canaria, Isleta Point *	28 11 0	15 25 16
G. Canaria, Palmas *	28 7 6	15 24 51
Teneriffe I., Angra Point *	28 35 25	16 8 6
Teneriffe I., Santa Cruz, Br. Con.	28 28 12	16 15 9
Teneriffe I., summit of peak	28 16 35	16 38 2
Gomera I., Port Gomera	28 8 0	17 5 55
Ferro I., Port Hierro	27 46 30	17 54 22
Palma I., N.E. point *	28 50 6	17 46 56
Cape Verde Islands.		
San Antonio I., E. point	17 5 30	25 0 5
San Antonio I., summit	17 4 0	25 17 0
St. Vincent I., f.-s. of telegraph station, Porto Grande	16 53 20	24 59 22
St. Lucia I., N. point	16 49 0	24 47 30
Raza I., E. point	16 38 0	24 38 30
St. Nicholas I., S. point	16 28 30	24 19 0
Sal I., N. point	16 51 0	22 54 34
Sal I., S. point	16 34 0	22 56 4
Bonavista I., N.W. point	16 13 20	22 55 44
Bonavista I., N.E. point	16 11 0	22 42 0
Bonavista I., New Town Ch.	16 7 36	22 56 0
Mayo I., English Road	15 7 30	23 13 4
St. Jago I., Porto Praya, coal wharf, Quail I.	14 54 0	23 31 9
St. Jago I., Porto Praya, S. light	14 53 40	23 31 45
Fogo I., N. S. da Luz, village	14 53 0	24 31 0
Brava I., anch. on W. side	14 48 0	24 43 34
BERMUDA Is., Ireland I., dockyard clock-tower	32 19 24	64 49 22

VI. Islands in the Atlantic Ocean—*continued.*

Places.	Lat. N.	Long. W.
	° ′ ″	° ′ ″
Bermuda Is., Ireland I., Bastion C	32 19 37	64 49 10
Hamilton I., Gibb's Hill *	32 15 4	64 51 36
St. David's I.*	32 21 40	64 40 40
St. Paul Rocks, summit	0 55 28	29 22 32
	Lat. S.	
Rocas Reef, N.W. sandy islet	3 51 30	33 49 29
Fernando Noronha, the Peak	3 50 10	32 25 30
ASCENSION I., Fort Thornton	7 55 20	14 25 30
ST. HELENA I., Obs. Ladder Hill	15 55 0	5 44 0
Martin Vas Rocks, largest islet	20 27 42	28 52 44
Trinidad I., S.E. point	20 32 26	29 19 36
Inaccessible I., centre	37 19 0	12 23 0
Tristan d'Acunha Is., Herald Point	37 2 45	12 18 30
Gough's I.	40 19 30	9 46 0

Places.	Lat. S.	Long. W.
	° ′ ″	° ′ ″
FALKLAND Is., Port Egmont, Settlement Cove	51 21 0	60 4 0
Mare Harbour, E. point of entr.	51 53 52	58 27 8
Port Louis, entr. to Careenage	51 32 20	58 6 58
Port Stanley, Governor's house	51 41 10	57 51 30
Cape Pembroke *	51 40 42	57 43 0
S. Georgia I., N. cape	54 4 45	38 15 0
Shag Rocks, centre	53 48 0	43 25 0
Sandwich Is., S. Thulé (approx.)	59 34 0	27 45 0
Sandwich Is., Traverse I., Volcano (approx.)	55 57 0	26 33 0
New S. Orkney Is., E. point of Laurie I.	60 54 0	44 25 0
New S. Orkney Is., E. summit of Coronation I.	60 46 0	45 53 0
New S. Shetland Is., Deception I., Port Foster	62 55 36	60 35 0
		Long. E.
Bouvet's I., (Circumcision), cen.	54 16 0	6 14 0

VII. Atlantic Coast of Europe.

Great Britain.	Lat. N.	Long. W.
	° ′ ″	° ′ ″
GREENWICH, Observatory	51 28 38	0 0 0
Oxford, University Observatory	51 45 34	1 15 4
Cambridge, Observatory	52 12 52	0 5 40
		Long. E.
North Foreland *	51 22 28	1 26 48
South Foreland *	51 8 23	1 22 22
Dungeness *	50 54 47	0 58 18
Beachy Head *	50 44 15	0 12 58
		Long. W.
South Sea Castle *	50 46 39	1 5 15
Portsmouth, Dockyard Obs.	50 48 3	1 5 58
Southampton *	50 53 42	1 24 28
Hurst Castle, W. light	50 42 21	1 33 4
Needles Rocks *	50 39 40	1 34 32
St. Catharine *	50 34 30	1 17 47
Portland, High *	50 31 18	2 27 18
START POINT *	50 13 18	3 38 28
Plymouth, Breakwater *	50 20 2	4 9 27
Eddystone *	50 10 49	4 15 53
Falmouth, St. Anthony Point *	50 8 0	5 1 0
LIZARD POINT, W. l.-h.	49 57 34	5 12 7
Porthcurnow, S.E. corner of telegraph station	50 2 44	5 39 18
Land's End, Longship's *	50 3 58	5 44 45
Scilly Is., St. Agnes *	49 53 31	6 20 41
Trevose Head *	50 32 55	5 2 8
Bideford *	51 4 14	4 12 5
Lundy I.*	51 10 0	4 40 20
Bristol, cathedral	51 27 24	2 35 55
Cardiff, E. light-house	51 27 46	3 9 45
Swansea *	51 36 55	3 55 45
Caldy I.*	51 37 52	4 40 59
St. Ann's, Upper light-house	51 40 55	5 10 28
Small's Rocks *	51 43 14	5 40 9
Aberystwith *	52 24 49	4 5 24
Bardsey I.*	52 44 59	4 47 55
South Stack *	53 18 23	4 41 54
Holyhead *	53 18 50	4 37 8
Skerries Rocks *	53 25 15	4 36 26
Bidstone *	53 24 2	3 4 23
Liverpool, Black Rock *	53 26 39	3 2 28
LIVERPOOL, Observatory	53 24 4	3 4 16
Morecambe Bay, Fleetwood *	53 55 35	3 0 22
Calf of Man, Upper light-house	54 3 14	4 49 37
Isle of Man, Ayre Point *	54 24 56	4 22 1
St. Bees *	54 30 48	3 38 8
Whitehaven *	54 33 10	3 55 50

Great Britain—*continued.*	Lat. N.	Long. W.
	° ′ ″	° ′ ″
Mull of Galloway *	54 38 5	4 51 22
Ayr (Firth of Clyde) *	55 28 9	4 38 11
Troon *	55 34 37	4 41 39
Ardrossan *	55 38 27	4 49 28
Pladda I. *	55 25 30	5 17 2
GLASGOW, Observatory	55 52 43	4 17 39
Cantyre *	55 18 38	5 48 8
Ila Rhins *	55 40 23	6 30 44
Oban *	56 25 10	5 31 0
Skerryvore Rocks *	56 19 24	7 6 45
Barra Head *	56 47 8	7 39 9
Isle of Glass *	57 51 26	6 38 27
Stornoway, Arnish Point *	58 11 28	6 22 10
Butt of Lewis *	58 30 40	6 16 0
Cape Wrath *	58 37 33	4 59 52
Dunnet Head *	58 40 19	3 22 30
Kirkwall (Orkneys) *	58 59 10	2 57 30
Start Point (Orkneys) *	59 16 42	2 22 30
North Ronaldshay *	59 23 5	2 22 10
Fair Island, summit	59 33 0	1 38 0
Sumburgh Head *	59 51 17	1 16 23
Scalloway (Shetland Is.), Castle	60 8 31	1 16 25
Lerwick (Shetland Is.), Fort	60 9 22	1 8 41
Hillwick Ness (Shetland Is.), S. extreme	60 27 10	1 30 14
Balta I. (Shetland Is.), cairn on E. side	60 45 3	0 47 17
Pentland Skerries, Upper li.-ho.	58 41 26	2 55 23
Tarbert Ness *	57 51 55	3 46 31
Buchan Ness *	57 28 14	1 46 22
ABERDEEN *	57 8 33	2 4 6
Budden Ness, Upper light-house	56 28 8	2 44 54
Bell Rock *	56 26 4	2 23 7
Isle of May *	56 11 8	2 33 21
Inchkeith Rock *	56 2 1	3 8 5
EDINBURGH, Observatory	55 57 23	3 10 54
Berwick *	55 45 53	1 58 57
Farn Island, N. W. light-house	55 36 59	1 39 21
Coquet Island *	55 20 2	1 32 17
Tynemouth *	55 1 5	1 24 52
North Shields *	55 0 31	1 26 10
Sunderland *	54 55 1	1 20 0
Hartlepool *	54 41 47	1 10 27
Flamborough *	54 6 58	0 4 51
Spurn Head, Upper light-house	53 34 41	0 7 11
Humber River, Killingholm upper light	53 38 49	0 13 2

VII. Atlantic Coast of Europe—*continued.*

Places.	Lat. N.			Long. E.		
Great Britain—*continued.*	°	′	″	°	′	″
Lowestoft *	52	29	12	1	45	28
Orfordness, N. light-house	52	5	36	1	35	12
Harwich *	51	56	38	1	17	25
Ireland.				Long. W.		
CAPE CLEAR	51	26	2	9	29	3
Fastnet Rock *	51	23	19	9	36	8
Mount Gabriel, Ordn. survey st.	51	33	24	9	32	44
Crookhaven *	51	28	33	9	42	17
Mizen Hill, Ordn. survey st.	51	27	41	9	48	19
Bantry Bay, Roancarrig *	51	39	10	9	44	49
Calf Rock *	51	34	10	10	14	50
Skellins Rocks *	51	46	6	10	32	29
VALENTIA *	51	56	0	10	19	15
Valentia, Port Magee	51	53	8	10	23	17
Dingle Bay, tower on Carhao H.	52	6	55	10	16	52
Blasket Is., Great Foze Rock	52	1	26	10	41	25
Smerwick, signal tower	52	13	46	10	21	40
Tralee Bay *	52	16	14	9	52	53
Beeves Rocks *	52	39	0	9	1	18
LIMERICK, cathedral	52	40	4	8	37	23
Shannon River, Loop Head *	52	33	38	9	55	55
Isles of Arran, Esragh *	53	8	58	9	51	30
Arran I.*	53	7	38	9	42	6
Galway, Mutton I.*	53	15	13	9	3	10
Golam Head, tower	53	13	46	9	46	3
Slyne Head, N. light-house	53	23	59	10	14	1
Clifden Bay, Gortrumnagh Hill.	53	29	47	10	3	54
Tully Mountain, Ordn. survey st.	53	35	0	10	0	15
Inishbofin, Gun Rock Tower	53	36	33	10	13	11
Inishturk I., tower	53	42	27	10	6	41
Westport Bay, Inishgat *	53	49	35	9	40	12
Newport, church	53	53	6	9	32	56
Clare I.*	53	49	38	9	58	58
BLACKSOD BAY, Bingham Castle	54	9	5	10	4	59
Eagle I., W. light-house	54	17	0	10	5	32
Broadhaven, Benwee Old Tower	54	19	18	9	49	29
Dounpatrick Head, Ordnance survey station	54	19	36	9	20	41
Anghris Head, Ordn. survey st.	54	16	33	8	46	2
Knocknarea, Tumulus	54	15	30	8	34	25
Sligo Bay, Black Rock *	54	18	27	8	37	1
Knocklane, Ordn. survey st.	54	20	50	8	40	14
Donegal Bay, St. John's Pt. light	54	34	8	8	27	33
Rathlin O'Birne Islet *	54	39	47	8	49	52
Aran I., Rinrawros *	55	0	54	8	33	36
Bloody Foreland, Ordn. survey st.	55	8	13	8	15	38
Tory I.*	55	16	20	8	14	54
Horn Head, Ordn. survey st.	55	12	31	7	57	15
Melmore Head, tower	55	15	14	7	47	12
Fanad Point *	55	16	33	7	37	53
Glashedy I., Ordn. survey st.	55	19	7	7	28	51
Malin Head, tower	55	22	50	7	22	22
INISHTRAHULL *	55	25	57	7	13	37
Innishowen Head, E. light-house	55	13	34	6	55	35
Moville, New Pier	55	10	50	7	3	20
LONDONDERRY, cathedral	54	59	40	7	19	25
Scalp Mountain, Ordn. survey st.	55	5	23	7	21	51
Benbane Head, summit	55	15	3	6	28	45
Rathlin I., Altacarry *	55	18	5	6	10	13
Maiden Rocks, W. light-house	54	55	48	5	44	17
Larne Lough, Fanes Point *	54	51	7	5	47	21
Belfast Lough, Grey Pt. (extr.)	54	40	35	5	44	20
Copeland Is.*	54	41	45	5	31	21
Donaghadee *	54	38	41	5	31	49
South Rock *	54	23	56	5	25	4
Dundrum Bay, St. John Pt. *	54	13	34	5	39	30
Carlingford Lough, Haulbowline Point *	54	1	11	6	4	41

Places.	Lat. N.			Long. W.		
Ireland—*continued.*	°	′	″	°	′	″
Rockabil *	53	35	48	6	0	11
Howth Peninsula, Bailey *	53	21	41	6	3	5
DUBLIN, Observatory	53	23	13	6	20	30
Dublin, N. wall *	53	20	47	6	13	33
Poolbeg *	53	20	31	6	9	1
Kingstown, E. pier light	53	18	7	6	7	31
Killiney Hill, Mapas obelisk	53	15	52	6	6	37
Bray Head, Ordn. survey st.	53	10	39	6	4	55
Wicklow, Upper light	52	57	54	6	0	5
Tara Hill, summit	52	41	55	6	13	1
Black Stairs Mountain, Ordn. survey station	52	32	55	6	48	17
Tory Hill, Ordn. survey st.	52	20	53	7	7	31
Wexford, college	52	20	4	6	28	15
Forth Mountain, Ordn. survey st.	52	18	57	6	33	41
TUSCAR ROCK *	52	12	9	6	12	22
Great Saltee, S. end	52	6	41	6	37	15
Waterford, Hoop Point *	52	7	24	6	55	43
Waterford, cathedral	52	15	33	7	6	24
Great Newton Head, Metal Man Tower	52	8	13	7	10	15
Dungarvan, Ballinacourty *	52	4	42	7	33	10
Knockmealdown Mount, Ordnance survey station	52	13	39	7	54	54
Helvick Head, Ordn. survey stn.	52	8	0	7	32	39
Mine Head *	51	59	30	7	35	13
Youghal *	51	56	23	7	50	15
Capel I., tower	51	52	54	7	51	10
Ballycottin *	51	49	31	7	59	3
Cork Harbour, Haulbowline Coal Wharf	51	50	33	8	18	20
QUEENSTOWN, Roche's Pt. *	51	47	33	8	15	15
Kinsale Old Head *	51	36	45	8	32	0
Seven Heads, tower	51	34	14	8	42	51
Galley Head, Ordn. survey stn.	51	31	47	8	57	7
Stag Rocks, largest	51	28	5	9	13	27
Braye Harbour *	49	43	20	2	12	6
St. Heliers, Victoria Pier *	49	10	29	2	6	45
Norway.				Long. E.		
Vardo, fortress	70	22	0	31	7	30
Vadso, New Church	70	4	3	29	46	50
NORTH CAPE, extreme	71	11	0	25	40	0
Hammerfest *	70	40	15	23	40	0
Tromsö, Observatory	69	39	12	18	57	0
Lofoten Is., Skraaven Island *	68	9	20	14	40	40
Trondheim, Mumkholmen f.-s.	63	27	4	10	23	30
Christiansund, Storvaden	63	7	1	7	43	35
BERGEN, cathedral	60	23	37	5	20	15
Christiansand, Odderö light	58	8	10	8	0	30
CHRISTIANIA, Observatory	59	54	44	10	43	35
Sweden.						
Gottenburg, signal station	57	40	58	11	53	54
Malmö, church	55	36	25	13	0	20
Falsterbö *	55	23	2	12	49	9
Karlscrona, Stumholm Tower	56	9	44	15	36	1
Oland I., S. point *	56	11	50	16	24	4
Gottland I., Hoburg light, S. pt.	56	55	18	18	11	6
STOCKHOLM, Observatory	59	20	35	18	3	30
UPSALA, Observatory	59	51	31	17	37	39
Russia.						
Torneå *	65	48	30	24	12	0
Uleaborg, Karlö I.*	65	2	20	24	34	0
Abo, Observatory	60	26	57	22	17	3
Aland Is., Skälskär *	60	24	45	19	34	0
Aland Is., Eckerö *	60	13	20	19	31	20
Aland Is., Lagskär *	59	50	50	19	54	5
Helsingförs, Observatory	60	9	43	24	57	17

VII. Atlantic Coast of Europe—*continued.*

Places.	Lat. N.			Long. E.		
	°	′	″	°	′	″
Russia—*continued.*						
Hogland I., Lower light	60	0	40	27	1	40
Hogland I., Upper light	60	6	22	26	58	44
Kronstadt, Frederikstadt *	59	58	14	29	47	12
ST. PETERSBURG, Obs.	59	56	30	30	19	22
PULKOWA, Observatory	59	46	19	30	19	40
Revel *	59	27	5	24	46	10
Nargen I.*	59	36	22	24	31	57
Baltic Port *	59	21	30	24	4	30
Dago I., Dager Ort *	58	55	2	22	11	36
Riga, Fort Kametski dike *	57	3	28	24	0	59
Libau *	56	31	1	20	59	40
Germany.						
Memel *	55	43	45	21	6	6
Pillau *	54	38	25	19	53	55
KONIGSBERG, Observatory	54	42	51	20	29	44
DANZIG, Observatory	54	21	18	18	39	46
Danzig, Neufahrwasser *	54	24	18	18	40	9
Rixhöft *	54	49	55	18	20	29
Stettin, N. castle tower	53	25	41	14	33	52
Swinemünde *	53	55	3	14	17	19
Bergen, church tower	54	25	8	13	26	11
Arcona *	54	40	53	13	26	12
Stralsund, St. Mary's Church	54	18	42	13	5	30
SCHWERIN, Observatory	53	37	38	11	25	10
Lübec, Observatory	53	51	31	10	43	53
Oldenburg, church	54	17	40	10	53	19
KIEL, Observatory	54	20	30	10	8	56
Büsum, church	54	7	52	8	51	53
Helgoland *	54	10	50	7	53	0
Neuwerke *	53	55	1	8	29	58
Cuxhaven *	53	52	25	8	42	43
Freiburg, church	53	49	39	9	17	33
ALTONA, Observatory	53	32	45	9	56	35
Hamburg, Observatory	53	33	7	9	58	25
Hamburg, St. Nicholas's Ch.	53	32	57	9	59	40
BERLIN, Observatory	52	30	17	13	23	44
Potsdam, Observatory	52	22	56	13	4	15
Leipsig, Observatory	51	20	6	12	23	30
Munich, Observatory	48	8	45	11	36	32
Gotha, Observatory	50	56	37	10	42	38
GOTTINGEN, Observatory	51	31	48	9	56	34
Manheim, Observatory	49	29	11	8	27	38
Strasburg, Observatory	48	35	0	7	46	10
Bonn, Observatory	50	43	45	7	5	49
Bremerhaven, New harbour *	53	32	54	8	34	12
WILHELMSHAVEN, Obs.	53	31	52	8	8	48
Emden, City Hall tower	53	22	6	7	12	25
Denmark.						
Falster, Giedser *	54	33	50	11	58	2
COPENHAGEN, New Obs.	55	41	14	12	34	47
Kronberg, high spire	56	2	20	12	32	2
Anholt L.*	56	44	15	11	39	13
Seierö I., Seierö Point	55	55	9	11	5	7
Nyborg, church spire	55	18	41	10	47	47
Cape Skaw, or Skaagen, old light-house	57	43	46	10	36	38
Holland.						
Niewe Diep, time-ball station	52	57	50	4	46	36
Amsterdam, W. church tower	52	22	30	4	53	4
UTRECHT, Observatory	52	5	10	5	7	50
Leyden, Observatory	52	9	20	4	29	3
The Hague, church tower	52	4	40	4	18	30
Scheveningen *	52	6	16	4	15	10
Brielle *	51	54	29	4	10	45
Rotterdam, time-ball station	51	54	30	4	28	50
Hellevoetsluis, time-ball stn.	51	49	19	4	7	40
Flushing, time-ball station	51	26	33	3	35	48
BRUSSELS, Observatory	50	51	11	4	22	18
ANTWERP, Observatory	51	12	28	4	24	44
Blankenberghe, fort l-h.	51	18	47	3	6	54
Ostend *	51	14	13	2	55	51
Nieuport, Templar's tower	51	7	53	2	45	34
France.						
PARIS, Observatory	48	50	11	2	20	14
Dunkerque, tower	51	2	9	2	22	31
Gravelines *	51	0	18	2	6	34
Calais *	50	57	45	1	51	7
Cape Grisnez *	50	52	10	1	35	1
Boulogne, column	50	44	32	1	37	5
Abbeville, tower	50	7	5	1	49	56
Cayeux *	50	11	42	1	30	46
Dieppe, tower	49	55	32	1	4	42
Ailly Point *	49	55	7	0	57	34
St. Vallery en Caux *	49	52	26	0	42	37
Fécamp, Notre Dame Church	49	46	4	0	22	17
Cape La Heve, S. light	49	30	43	0	4	7
Havre, steeple	49	29	16	0	6	34
Honfleur, W. light-house	49	25	32	0	13	42
				Long. W.		
Caen, church tower	49	11	14	0	21	10
Port Corseulles, E. jetty light	49	20	18	0	27	34
De Ver Point *	49	20	28	0	31	10
Cape La Hougue *	49	34	19	1	16	22
Cape Barfleur *	49	41	50	1	15	57
Cherbourg *	49	40	28	1	37	9
CHERBOURG, Naval Obs.	49	38	54	1	38	8
Cape La Hague *	49	43	22	1	57	16
Casquets Rocks *	49	43	22	2	22	42
Port St. Peter, Castle Comet *	49	27	13	2	31	31
Douvres Rocks *	49	6	28	2	48	49
Cape Carteret *	49	22	27	1	48	26
Coutances, cathedral tower	49	2	54	1	26	39
Granville *	48	50	7	1	36	47
Chausy Is.*	48	52	13	1	49	21
St. Malo, Rochebourne *	48	40	18	1	58	42
Cape Frehel *	48	41	5	2	19	11
Heaux de Brehat *	48	54	33	3	5	12
Morlaix, tower, St. Mark's Ch.	48	34	38	3	50	2
De Bas Islet *	48	44	45	4	1	39
Abervrach, Vrach Islet *	48	36	57	4	34	35
Ushant, N.E. light	48	28	31	5	3	28
BREST, Observatory	48	23	32	4	29	36
De Sein Islet *	48	2	39	4	52	4
Bec du Raz *	48	2	22	4	43	58
Audieme *	48	0	34	4	32	28
Penmarch Rocks *	47	47	52	4	22	31
Glenan Is., Penfret L.*	47	43	17	3	57	16
De Groix L.*	47	38	53	3	30	36
L'Orient, church tower	47	44	53	3	21	32
Belle Isle *	47	18	41	3	13	20
Port Haliguen *	47	29	10	3	6	10
Hoedic I.*	47	20	36	2	51	54
Port Navalo *	47	32	54	2	55	9
Vannes, St. Pierre Church	47	39	30	2	45	28
Le Four Rock *	47	17	53	2	38	6
Croisie, end of breakwater	47	18	30	2	31	26
Guerande, steeple	47	19	44	2	25	48
Port St. Nazaire, spire	47	16	22	2	11	57
Paimbœuf, steeple	47	17	17	2	2	9
Nantes, cathedral	47	13	8	1	32	59
Noir Moutier I.*	47	0	41	2	13	17
Le Pilier I.*	47	2	36	2	21	38
D'Yeu I*	46	43	5	2	22	57
La Chaume *	46	29	40	1	47	46
Point de Grouin du Cou *	46	20	41	1	27	50
Rhé I., N.W. point *	46	14	40	1	33	41

VII. Atlantic Coast of Europe—*continued.*

Places.	Lat. N.	Long. W.
France—*continued.*	° ′ ″	° ′ ″
ROCHELLE, W. light	46 9 22	1 9 6
Aix I.*	46 0 36	1 10 41
Rochefort, hospital	45 56 37	0 57 50
Oleron Island, N.W. point*	46 2 49	1 24 38
Point de la Courbe*	45 41 35	1 15 21
Point Cordovan*	45 35 13	1 10 25
Point de Grave*	45 34 10	1 10 25
Pauillac, Middle light	45 11 57	0 44 42
BORDEAUX, St. André	44 50 19	0 34 42
Bayonne, cathedral	43 29 29	1 28 43
Biarritz*	43 29 41	1 33 23
St. Jean de Luz*	43 23 17	1 40 11
Spain and Portugal.		
Fuenterrabia, Cape Higuera*	43 23 50	1 47 54
Port Passages, entrance	43 20 10	1 56 16
San Sebastian, Monte Igueldo*	43 19 33	2 1 9
BILBAO, Galea Castle*	43 22 36	3 4 10
Castro Urdiales, St. Ana Castle	43 24 10	3 16 14
Santoña, ruin on Passage Pt	43 26 8	3 30 28
Santander, La Darsena	43 27 52	3 48 51
San Martin de la Arena*	43 26 49	4 1 4
San Vincent de la Barquera, end of new mole	43 23 10	4 25 24
Rivadesella, Mole head	43 28 28	5 6 34
Gijon, Santa Catalina*	43 32 48	5 40 11
Aviles*	43 38 5	5 56 8

Places.	Lat. N.	Long. W.
Spain, Portugal—*continued.*	° ′ ″	° ′ ″
Rivadeo*	43 35 0	7 4 24
Estaca Point*	43 47 20	7 44 9
Port Cedeiro*	43 39 0	8 5 24
FERROL, Priorino Chico*	43 27 30	8 21 8
Coruña, Hercules Tower*	43 23 10	8 24 30
Cape Finisterre*	42 52 45	9 15 32
Vigo, Crès I.*	42 12 30	8 53 54
Oporto, N. S. de Luz*	41 9 9	8 38 15
Cape Mondego*	40 10 59	8 52 1
Burlingo I.*	39 25 0	9 28 0
Peniche*	39 21 8	9 24 26
Cape Roca*	38 47 5	9 27 13
LISBON, Royal Observatory	38 42 31	9 11 7
Setuval*	38 31 9	8 53 0
Cape St. Vincent*	37 1 15	8 57 31
Lagos, church	37 7 48	8 39 53
Cape Sta. Maria*	36 58 0	7 49 36
Agamonte, castle	37 13 15	7 25 37
Haelva, plaza at head of mole	37 15 8	6 57 12
San Lucar, Chipiona*	36 43 57	6 26 34
CADIZ, Obs. of San Fernando	36 27 40	6 12 20
Cadiz, San Sebastian*	36 31 29	6 19 7
Cape Trafalgar*	36 10 50	6 2 17
Tarifa*	35 59 55	5 36 35
Algeciras, Verdo I.*	36 7 11	5 26 2
GIBRALTAR, Dockyard f-s	36 7 10	5 21 27
Gibraltar, Europa Point*	36 6 30	5 20 50

VIII. Coasts of the Mediterranean, Adriatic, and Black Seas.

Spain.	Lat. N.	Long W.
Malaga*	36 42 39	4 25 7
Almeria, monument	36 50 16	2 28 10
Cape de Gata*	36 43 00	2 11 20
Mazarron*	37 33 24	1 15 6
CARTAGENA, arsenal gate	37 35 50	0 59 9
Cartagena, Escombrera Islet	37 33 22	0 57 58
Porman*	37 34 32	0 40 21
Santa Pola Bay*	38 12 26	0 30 38
Alicante, Castle of La Barbara	38 20 47	0 28 34
Villajoyose*	38 30 14	0 13 31
Benidonne, tower	38 30 57	0 10 6
Altea*	38 33 41	0 2 43
		Long. E.
Calpe, church tower	38 38 36	0 2 52
Morayva, tower	38 40 51	0 9 17
Jarea, Cape San Antonio*	38 48 6	0 12 2
Denia, castle	38 50 30	0 6 40
		Long. W.
Cape Cullera*	39 11 7	0 12 50
VALENCIA, astronomical pier	39 27 10	0 19 14
Valencia, mole-end*	39 27 9	0 18 51
		Long. E.
Columbretes Is.*	39 53 57	0 41 23
Oropesa*	40 4 53	0 8 55
Vinaroz, mole-head*	40 27 48	0 28 52
Port Alfaques, Baña*	40 33 35	0 39 53
Cape Tortosa*	40 43 24	0 56 59
Tarragona, E. mole*	41 6 0	1 15 0
BARCELONA, Old mole-head	41 22 10	2 10 55
Palamos, church	41 51 0	3 6 0
Cadaquès, clock tower	42 17 8	3 16 25
Cape Creux*	42 19 10	3 18 59
France.		
Cape Beam*	42 30 59	3 7 29
Port Vendres, Fort Fanal*	42 31 18	3 6 49
Port Nouvelle, W. jetty*	43 0 51	3 3 57
Cette, St. Louis mole*	43 23 48	3 42 6
Aigues Mortes, N. W. mole-head	43 32 10	4 8 20

France—*continued.*	Lat. N.	Long. E.
Planier Rock*	43 11 57	5 13 49
MARSEILLES, New Observatory	43 18 22	5 23 43
Ciotat, Berouard mole*	43 10 21	5 36 41
TOULON, arsenal clock-tower	43 7 17	5 56 5
Hyères Is.*	43 1 3	6 8 37
Cannes*	43 32 50	7 0 52
Antibes, Garoupe*	43 33 51	7 8 1
Nice, St. Francois tower	43 41 58	7 16 46
Villa Franche, mole-head*	43 41 58	7 18 41
Villa Franche, Cape Ferret*	43 40 30	7 19 40
Iviza, citadel flag-staff	38 54 21	1 26 27
Cabrera I., Port Cabrera Castle	39 7 0	2 57 40
Majorca, Palma, Mole*	39 33 39	2 38 11
Minorca, Port Mahon*	39 52 0	4 21 0
Sardinia.		
Cape Spartivento*	38 52 34	8 51 8
Cape Sandalo, San Pietro I.*	39 8 43	8 13 57
Porte Conte, Cape Caccia*	40 33 50	8 10 0
Port Torres*	40 50 10	8 24 30
Cape Testa*	41 14 40	9 8 50
Razzoli I.*	41 18 25	9 20 30
Caprera I., Galera Point	41 14 15	9 29 40
Cape Figar, signal station	40 59 52	9 39 7
Cape Tavolara*	40 55 0	9 44 20
Cape Bellavista*	39 55 45	9 43 25
Cape Carbonera, Cavoli I.*	39 5 15	9 32 35
CAGLIARI, cathedral	39 13 5	9 7 33
Corsica.		
Bonifacio, Mt. Pertusato*	41 22 10	9 11 14
Ajaccio, cathedral tower	41 54 59	8 44 19
Corti, church tower	42 18 14	9 9 4
Calvi, cathedral tower	42 34 36	8 45 42
Cape Corso, Giraglia I.*	43 1 45	9 24 9
Bastia, Santa Maria tower	42 41 30	9 27 13
Porto Vecchio, Chiape Point*	41 35 45	9 21 59

VIII. Coasts of Mediterranean, Adriatic, and Black Seas—*continued.*

Places.	Lat. N.			Long. E.		
Italy.	°	′	″	°	′	″
Cape Melle *	43	57	18	8	10	9
Genoa, San Benigno *	44	24	17	8	54	20
Spezzia, Fort Santa Maria *	44	4	0	9	50	48
FLORENCE, Observatory	43	46	4	11	15	22
Leghorn, S. end of Curved breakwater *	43	32	33	10	17	22
Capraia I., Cape Ferrajone *	43	2	56	9	50	50
Elba I., Porto Longone, Fort Forcado *	42	45	14	10	24	33
Pianosa I.*	42	35	18	10	5	57
Africa Rock *	42	21	28	10	3	49
Monte Christo Islet, summit	42	20	15	10	18	39
Giglio I., Port Giglio, mole-hd.*	42	21	35	10	55	15
Civita Vecchia, breakwater *	42	5	25	11	47	6
ROME, Observatory	41	53	54	12	28	40
Gaeta, Orlando Tower	41	12	25	13	34	39
Ponza Islet *	40	53	40	12	57	34
Naples, Observatory	40	51	46	14	14	44
Capri I., Carena Point *	40	32	8	14	11	46
Lipari I., St. Angelo Chapel	38	29	18	14	56	6
Ustica I., Fort Falconara	38	43	17	13	11	10
Faro of Messina, Capo di Faro *	38	16	2	15	38	58
Milazzo, Mole-head *	38	13	2	15	14	48
PALERMO, Observatory	38	6	44	13	21	16
Trapani, Palumbo Rock *	38	0	39	12	29	8
Maritimo I.*	37	57	13	12	2	55
Marsala *	37	47	10	12	25	59
Girgenti, Port Empedoche, extr. of pier	37	16	58	13	31	32
Gozo I.*	36	4	12	14	13	16
MALTA I., Valetta Harbour, Spencer's Monument	35	53	0	14	30	40
Linosa I., Landing Cove	35	51	50	12	52	9
Lampedusa I., Carallo Bianco *	35	29	40	12	35	39
Cape Passero *	36	41	10	15	8	57
Syracuse, Maniace Castle *	37	8	4	15	17	37
Augusta Port, Torre d'Avola *	37	12	39	15	13	20
Catania, Sciari Biscari *	37	29	35	15	5	19
Cape Taormina, Semaphore	37	50	25	15	18	30
Messina, San Ranieri tower	38	11	33	15	34	19
Cape Peloro *	38	16	3	15	38	58
Cape Spartivento *	37	55	29	16	3	31
Cape Colonne *	39	1	29	17	12	9
Cotrone *	39	4	38	17	8	7
Taranto, Cape St. Vito *	40	24	40	17	12	23
Gallipoli, St. Andrea *	40	2	48	17	56	37
Cape Sta. Maria de Leuca *	39	47	43	18	22	17
Cape Otranto *	40	6	23	18	30	37
Port Otranto, castle	40	9	6	18	28	45
BRINDISI, Castello I., Fort à Mare *	40	39	21	18	0	27
Bari, St. Catalolo *	41	8	19	16	50	52
Viesti, light on Sta. Croce Rock	41	53	17	16	11	38
Manfredonia *	41	37	38	15	55	34
Tremiti Is., Caprara I.*	42	8	30	15	31	54
Ancona, Monte Cappucini *	43	37	15	13	31	19
Malamocco, Rocchetta *	45	20	30	12	19	9
Venice, Observatory	45	25	49	12	21	19
Austria.						
Grado, church tower	45	40	37	13	23	13
Monfalcone, church tower	45	48	33	13	32	10
TRIESTE, Obs. Naut. Academy	45	38	51	13	46	0
Trieste, Theresa Mole *	45	38	59	13	45	27
Capo d'Istria, cathedral tower	45	32	56	13	43	53
Isola, church tower	45	32	26	13	39	35
Pirano, cathedral tower	45	31	48	13	34	12
Salvore Point *	45	29	26	13	29	34
Citta Nuova, church tower	45	18	29	13	33	37
Parenzo, cathedral tower	45	13	45	13	35	39
Austria—*continued.*						
Rovigno, St. Eufemia tower	45	5	2	13	37	56
POLA, N. cupola of obs	44	51	49	13	50	46
Promontore Point, Porer Rock *	44	45	31	13	53	33
Nera Point *	44	57	25	14	8	42
Fiume, cathedral tower	45	19	36	14	26	41
Porto Ré, castle	45	16	48	14	34	11
Veglia, Mole-head *	45	1	30	14	34	36
Prestenizza Point *	45	7	12	14	16	30
Cherso, Kimen Point *	44	57	36	14	23	30
Galiola Rock *	44	43	43	14	10	36
Unie I., Netak Point	44	37	18	14	14	6
Lussin Piccolo, Sta. Maria Ch.	44	31	56	14	28	26
St. Pietro di Nembo I., health office	44	27	42	14	33	28
Gruizza Rock *	44	24	42	14	34	6
Zengg, Mole-head *	44	59	30	14	53	34
Terstenik Rock *	44	40	7	14	34	42
Carlopago *	44	31	30	15	4	24
ZARA, church tower	44	7	5	15	14	5
Bianche Point *	44	9	8	14	49	8
Zara Vecchia, church tower	43	50	16	15	26	21
Port Tajer, Lestrice I.*	43	51	18	15	12	6
Lucrietta Rock *	43	37	36	15	34	24
Sebenico, Mount Tartaro	43	45	8	15	58	7
Rogosnizza Port, Mulo Rock *	43	31	0	15	55	12
Zirona Grande I., St. George Church tower	43	27	0	16	8	51
Trani, cathedral tower	43	31	2	16	15	9
Port Spalatro, cathedral tower	43	30	26	16	26	34
Solta Island, Port Olivetto, St. Nicholas tower	43	28	55	16	12	16
Spalato Passage, Cape Ipeo *	43	19	12	16	24	30
Makarska, church tower	43	17	46	17	1	36
Pomo Rock, centre	43	5	28	15	27	30
St. Andrea Rock, summit	43	1	43	15	45	29
LISSA I., Hoste Rock *	43	4	34	16	12	24
Pakonjidol Rock *	43	9	25	16	27	19
Lessina I., Port Gelsa *	43	9	50	16	41	52
Lessina I., St. Giorgio Point *	43	7	30	17	12	0
Sabionello Peninsula, Cape Gomera *	43	2	48	17	0	24
Sorelle Rocks *	42	57	42	17	12	43
Curzola I., Porto Bema mole hd.	42	54	19	16	51	32
Curzola I., Porto Valle Grande, church tower	42	57	37	16	43	7
Lagostini I., Glaret Rock	42	45	54	17	8	55
Lagosta I., St. George Chapel	42	45	5	16	51	45
Cazza I.*	42	45	6	16	29	30
Pelagosa Rock *	42	23	28	16	15	43
Meleda I., Port Palazzo Ruin	42	47	6	17	22	51
Olipa Rock *	42	45	30	17	46	48
Pettini di Ragusa Rocks *	42	39	0	18	3	0
Bobara Rock, summit	42	35	8	18	10	49
Molonta Peninsula, summit	42	27	4	18	25	36
Ostro Point *	42	23	45	18	31	23
CATTARO, health office	42	25	30	18	46	12
Badua *	42	16	42	18	50	31
Katic Rock, St. Domenica Ch.	42	11	43	18	56	25
Albania.						
Antivari, Point Valovica summit	42	3	56	19	6	41
Dulcigno, W. wind-mill	41	55	47	19	12	29
Cape Rodoni, guard-house	41	35	8	19	27	4
Cape Pali, guard-house	41	23	31	19	24	54
Durazzo, N. pyramid	41	19	54	19	25	41
Cape Laghi, ruin	41	8	44	19	26	47
Skumbi R., pyramid at mouth	41	2	12	19	26	30
Semeny R., pyramid at mouth	40	47	3	19	22	11
Vojazza R., pyramid at mouth	40	36	14	19	19	14
Sassena I., pyramid summit	40	29	47	19	17	44

VIII. Coasts of Mediterranean, Adriatic, and Black Seas—*continued.*

Places.	Lat. N.			Long. E.		
Albania—*continued.*	°	′	″	°	′	″
Avlona, minaret	40	28	6	19	29	42
Cape Linguelta, extreme	40	25	17	19	17	45
Mount Cica, pyramid	40	12	0	19	38	33
PORT PALERNO, pyramid	40	2	57	19	47	53
Cape Kiefali, pyramid	39	54	29	19	54	55
Fano I., Point Kastri *	39	51	40	19	26	50
Port Pagonia, ruin	39	39	27	20	7	12
Port Gomenitza, Well Dogana	39	29	50	20	17	9
Port Parga, Madonna I.	39	16	32	20	24	55
Greece.						
Port St. Spiridone, convent	39	39	54	19	43	9
CORFU, flag-staff bastion	39	37	7	19	56	30
Paxo I., Madonna I.*	39	11	30	20	12	20
Prevesa, Fort Nuovo minaret	38	56	30	20	45	40
Port Drepano, Observation L.	38	47	25	20	44	16
Port Vliko, custom-house	38	40	40	20	42	44
Port Vathi, Lazaretto *	38	22	4	20	43	37
Port Argostoli, St. Theodoro *	38	11	36	20	29	30
PATRAS, castle	38	14	47	21	44	47
Katakolo Bay *	37	39	10	21	20	0
Zante *	37	47	10	20	55	21
Strovathi, or Strivali Islands, Stamphani I.*	37	15	12	21	1	12
Proti Passage, Marathon Pt.	37	3	38	21	34	35
Narasin Bay, Pratique flag-staff	36	54	32	21	41	59
Mothoni, round tower	36	48	35	21	42	36
Koroni Anchorage, Mole	36	47	50	21	58	1
Petalidi Bay, Petalidi Point	36	57	16	21	56	33
CANDIA I., Port Suda *	35	27	55	24	9	30
Candia I., Megalo Kastron *	35	20	30	25	9	35
Kandeliusa I., summit	36	29	55	26	59	25
Stampali I., Maltezana Port, Agios Ioanes	36	34	25	26	24	28
Christiana Is., N. point	36	15	20	25	13	0
MILO I., summit, Mt. St. Elias	36	40	27	24	28	8
Siphanto I., Cape Kondo	36	54	0	24	42	30
Naxos I., Naxia, Gate on Bacchus I.	37	6	32	25	23	0
Paros I., Port Trio, Trio Point	37	0	1	25	14	21
Paros I., Port Naussa, St. Yanni Church	37	8	38	25	14	8
Syra *	37	26	0	24	58	6
Sermo I., Amyno Point	37	7	36	24	32	23
Thermia I., ruins of Cythnus	37	25	55	24	23	35
Jura I., N. point	37	38	0	24	44	32
PORT ST. NIKOLO *	37	39	28	24	19	40
St. Nikalao I., Port Mandri	37	44	0	24	4	12
Andros I., Port Gavrion St. Nikalaos	37	52	52	24	44	40
Ieraka, Acropolis	36	47	5	23	5	40
Port Kheli, custom-house	37	19	15	23	9	53
Poros Harbour, Lazaretto	37	29	16	23	28	27
Ægina, Temple of Venus	37	44	51	23	25	38
Pirsæus, custom-house	37	56	10	23	38	40
ATHENS, Observatory	37	58	20	23	43	55
Cape Colonna, extreme	37	38	45	24	2	15
Port Raphti, Statue I.	37	52	48	24	8	0
Petali I., Trago I. peak	38	1	28	24	16	42
Euripo, bridge	38	27	23	23	35	52
Skiathos I., Mount Stavros	39	10	48	23	27	7
Salonika, S. bastion	40	37	28	22	58	0
Port Baklar, Cape Xeros	40	32	40	26	45	0
Lemnos I., Kastro Castle	39	52	10	25	3	20
Port Moudros, Sangrada Point	39	50	52	25	14	14
Strati I., St. Strati Church	39	31	58	44	59	18
MITYLENI I., Port Sigri, fort	39	12	24	25	51	20
Mityleni I., Mityleni Point *	39	6	10	26	34	50
Mityleni I., Pt. Iero, Sidero Islet	39	3	20	26	31	39
Khios I., Port Scio, fort	38	22	40	26	9	15
Greece—*continued.*						
Samos Strait, Chapel Islet	37	41	40	27	2	27
Port Isene, tower	37	16	33	27	36	55
Kos, landing-place	36	53	36	27	19	15
Marmorice Harbour, Adassi Pt.	36	47	58	28	18	5
Makry Harbour, Kasil I.	36	39	33	29	6	13
RHODES PORT, Arab's Tower	36	26	36	28	16	14
Port Lindo, tower	36	5	53	28	8	10
Turkey.						
Dardanelles, Hellas Point *	40	2	22	26	10	50
Gallipoli *	40	24	18	26	39	24
Bosporus, Tofana Point *	41	1	20	29	1	0
Scutari, Leander Tower *	41	1	2	29	0	45
CONSTANTINOPLE, Seraglia Point *	41	0	30	29	0	55
Constantinople, St. Sophia Mosque	41	0	16	28	58	59
Cape Karabournon *	41	19	15	28	42	0
Russia.						
Yuiada Road, Fort Tersana	41	52	4	27	58	45
Burghaz *	42	28	0	27	35	35
Varna, Erlar Battery	43	12	0	27	57	16
Kusterjeh, Cape Kusterjeh *	44	10	20	28	39	10
Danube River, Sulina *	45	9	36	29	40	36
Fidoni I.*	45	16	17	30	14	23
ODESSA, Observatory	46	28	36	30	45	34
Dnieper Bay, Fort Nikolaeo	46	36	23	31	32	38
Sevastopol *	44	36	55	33	36	26
Balaklava Bay, hospital	44	29	50	33	36	25
Kertch *	45	21	3	36	28	28
Berdiansk, breakwater *	46	45	25	36	47	5
Saukhoum *	42	58	0	40	55	10
BATOUM *	41	39	0	41	36	15
Turkey.						
Trebizond *	41	1	0	39	46	25
Sinope *	42	1	18	35	13	30
Bender Erekli, round tower	41	18	3	31	26	34
Marmora I.*	40	37	40	27	45	30
Artaki Bay, Zeitijn Adasi Islet	40	23	30	27	47	30
Tenedos I., Ponento point *	39	50	0	25	58	45
Port Ajano, Nikolo Rock	39	1	21	26	47	57
Port Ali-Agha, W. point of entrance	38	50	10	26	57	20
SMYRNA, English consul's f.-s.	38	25	40	27	9	10
Vourlah, custom-house	38	21	48	26	47	0
Sighajik Harbour, beacon on islet	38	12	21	26	47	32
Budrum, Kalessi Point	37	1	52	27	27	35
Adalia *	36	52	0	30	45	30
Alexandretta *	36	35	30	36	10	20
Latakiyah *	35	30	30	35	46	30
Tripoli Roadstead, Tower of Lions	34	27	6	35	49	23
Ruad I., minaret	34	51	42	35	51	15
BEIRUT *	33	54	10	35	30	35
Saida (ancient Sidon), S. end of Jezireh I.	33	34	25	35	21	36
Sür (ancient Tyre), N. fort	33	16	45	35	11	26
Acre, Manara	32	55	27	35	4	24
Haifa, minaret	32	49	12	35	0	1
CYPRUS I., Famagusta, N. bastion	35	7	5	33	58	0
Cyprus I., Limasol, battery	34	40	0	33	2	36
Cyprus I., Larnaka *	34	55	0	33	39	0
Port Said *	31	15	45	32	18	53
River Nile, Damietta Mouth	31	31	30	31	51	8

VIII. Coasts of Mediterranean, Adriatic, and Black Seas—*continued.*

Places.	Lat. N.	Long. E.
	° ′ ″	° ′ ″
River Nile, Rosetta Mouth *	31 29 30	30 19 8
Aboukir Bay, Nelson I. peak	31 21 23	30 6 0
ALEXANDRIA, Eunostos Point *	31 11 27	29 51 40
Ben Ghazi, castle	32 6 51	20 2 40
Tripoli Harbour, Lazaretto Pier	32 54 22	13 11 15
Tunis.		
Sphax, Mole battery	34 43 52	10 46 11
Mehediah, Sidi Jubber	35 30 24	11 5 15
Monastir, Burj el Kelb Battery	35 45 24	10 50 42
Hammamet Bay, castle flagstaff	36 23 20	10 37 10
Kalibia Road, landing-place	36 49 45	11 6 2
CAPE BON *	37 4 45	11 3 15
Tunis, Goletta *	36 48 36	10 18 37

Places.	Lat. N.	Long. E.
	° ′ ″	° ′ ″
Algeria.		
Cape Farina, extreme	37 10 42	10 17 30
Benzert Road, S.E. angle of fort	37 17 3	9 52 55
Galita I., Monte Guardia	37 31 16	8 56 12
Bona, Fort Genois *	36 57 5	7 48 13
Stora, Singe I. *	36 54 29	6 54 29
Cape Bongaroni *	37 5 17	6 29 54
Cape Carbon *	36 46 45	5 7 40
ALGIERS *	36 47 23	3 3 30
Cape Tenes *	36 33 8	1 21 49
		Long. W.
Oran *	35 42 56	0 37 21
Habibas I. *	35 43 22	1 6 33
Zafarin I., S. point Isabel Segunda I.	35 10 50	2 26 0
Alboran I. *	35 58 0	3 1 0
Ceuta *	35 53 44	5 16 42
Tangier, Casbah Tower	35 47 10	5 48 40
CAPE SPARTEL *	35 47 14	5 55 41

IX. West Coast of Africa.

	Lat. N.	Long. W.
	° ′ ″	° ′ ″
El Araish, S. point of entrance	35 12 50	6 9 13
Sali, fort	34 4 15	6 48 0
Cape Dar-el-Beida, extreme	33 38 0	7 35 39
Cape Blanco, North, extreme	33 8 0	8 35 5
Mogador Har., English consul's house	31 30 30	9 43 30
Cape Ghir, extreme	30 38 0	9 50 0
Cape Noun, extreme	28 45 0	11 2 0
Cape Juby, extreme	27 57 50	12 52 30
CAPE BOJADOR, extreme	26 7 57	14 29 0
Penha Grande	25 7 6	14 50 44
Ouro River entrance, Durnford Point	23 36 3	15 58 0
Pedra de Galha	22 12 37	16 48 11
Cape Blanco, South, extreme	20 46 27	17 5 40
Portendik, village	18 18 45	16 2 0
St. Louis *	16 0 50	16 33 40
Almadie Point *	14 45 8	17 32 6
CAPE VERDE *	14 43 30	17 31 0
Port Dakar *	14 40 30	17 26 13
Cape Manoel *	14 38 50	17 28 31
Goree I., fort	14 39 55	17 24 30
Bird I., flag-staff	13 39 45	16 40 30
Bathurst, flag-staff	13 28 0	16 35 0
Carabane *	12 35 0	16 44 0
Nunez River, Sand I.	10 36 37	14 42 0
Ponga River entrance, obs. point	10 3 15	14 4 30
Isles de Los, head of bight, N. side of Crawford I.	9 27 24	13 48 30
Matacong I., house	9 16 10	13 26 20
Scarcies River, W. end of Yellaboi I.	8 57 5	13 18 25
SIERRA LEONE *	8 30 0	13 18 30
Sherbro I., N. island	7 40 36	13 4 30
Sherbro River, Manna Point	7 22 45	12 31 55
Gallinas River, W. elbow of Kamasoun I.	7 0 8	11 38 45
Cape Mount, W. peak	6 44 30	11 22 51
Cape Mesurado *	6 19 0	10 50 0
Monrovia, Government house	6 19 5	10 48 55
Marshall, agent's house	6 8 6	10 22 45
Grand Bassa, agent's house	5 54 8	10 4 5
Cestos, factory	5 26 25	9 34 45
Sangwin River, Sangwin Point	5 12 42	9 20 16
Sinon, Bloobarra Point	4 59 15	9 2 5
CAPE PALMAS *	4 22 10	7 44 16
Tabou River, Tabou Point	4 24 47	7 21 30
Axim Bay, Fort St. Anthony	4 52 18	2 14 45

	Lat. N.	Long. W.
	° ′ ″	° ′ ″
Cape Three Points *	4 45 0	2 5 45
Dix Cove, fort	4 47 45	1 56 40
Tacorady Bay, Tacorady Point	4 53 0	1 45 0
Chama Bay, Dutch Fort	5 1 0	1 38 0
El Mina Bay, Fort St. George	5 4 48	1 20 15
Cape Coast Castle, N.E. bastion	5 6 5	1 13 40
Accra *	5 31 50	0 11 30
		Long. E.
Volta River entrance, Dolben's Point	5 46 0	0 41 0
LAGOS, English Church	6 28 21	3 25 50
Benin River entrance, N. point	5 46 1	5 3 5
Brass River, entrance (approx.)	4 16 40	6 15 0
Calebar R. (New), Rough Corner	4 23 7	7 7 0
Opobo R., W. pt. beacon (approx.)	4 27 0	7 40 0
Quaebo River, Bluff Point	4 30 40	7 59 0
Calebar River (Old), Townsend flag-staff (Dunketown)	4 56 24	8 20 46
Fernando Po I. *	3 46 0	8 47 0
San Bento R., Joho Pt. (approx.)	1 35 0	9 39 0
Prince's I., Diamond Rocks, centre of largest	1 40 42	7 27 56
St. Thomas I., Fort San Sebastian	0 20 30	6 42 40
	Lat. S.	
Anno Bon I., Turtle Islet	1 24 18	5 38 12
CAPE LOPEZ, extreme	0 36 0	8 43 40
Mayumba Bay, Matooti Point	3 22 42	10 30 51
Loango Bay, Indian Point	4 38 30	11 45 0
Black Point Bay, Sandy Point	4 49 0	11 45 0
Malemba Bay, Landing Cove	5 18 30	12 8 0
Kabenda Bay, Kabenda Point	5 33 0	12 10 0
CONGO RIVER entrance, Shark Point	6 4 36	12 15 0
Margate Head, summit	6 31 50	12 25 25
St. Paul de Loando, flag-staff, Fort San Miguel	8 48 18	13 13 6
Lobito Point, extreme	12 20 0	13 32 0
Benguela, fort	12 33 54	13 25 9
Elephant Bay, Friar Rocks	13 14 0	12 45 0
St. Mary Bay, Bay I.	13 26 5	12 36 0
Little Fish Bay, flag-staff	15 13 0	12 9 0
Port Alexander, Bateman Point	15 44 34	11 56 47
Great Fish Bay, Tiger Point	16 30 0	11 42 0
Cape Frio, extreme	18 23 0	11 57 12
WALWICH BAY, Pelican Pt. beacon	22 53 32	14 28 30
Ichabo I., summit	26 17 0	14 55 0
Angra Pequena, Guano I., sumt	26 37 50	14 55 15

IX. West Coast of Africa—*continued.*

Places.	Lat. S.	Long. E.	Places.	Lat. S.	Long. E.
	° ′ ″	° ′ ″		° ′ ″	° ′ ″
Elizabeth Bay, S. point	26 58 0	15 13 0	Saldanha Bay, Constable Hill	33 7 51	18 1 26
Port Nolloth, S. beacon	29 15 50	16 52 20	Table Bay, Robben I.*	33 48 52	18 22 33
Hondeklip Bay	30 18 33	17 16 20	Cape Town, Observatory	33 56 3	18 28 40
Roodewal Bay	30 33 7	17 27 30	CAPE OF GOOD HOPE*	34 21 12	18 29 30

X. East Coast of Africa and the Red Sea.

East Coast of Africa.	Lat. S.	Long. E.	E. Coast of Africa—*cont.*	Lat. S.	Long. E.
Simon's Bay, time-signal	34 11 28	18 31 40	Monfia I., Moresby Point	7 38 36	39 57 51
Cape Hangklip, extreme	34 23 48	18 50 20	Dar-Es-Salaam, flag-staff	6 49 41	39 20 19
Quoin Point, extreme	34 48 0	19 40 0	Bagamoyo, French Mission	6 26 10	38 57 10
CAPE AGULHAS*	34 49 46	20 0 37	ZANZIBAR, English consulate	6 9 43	39 11 11
Port Beaufort, flag-staff	34 23 47	20 48 45	Tanga Bay, E. side of Tanga I.	5 4 45	39 6 55
St. Blaize*	34 11 10	22 9 31	Mombaza, castle	4 4 0	39 43 9
Knysna Har., Fountain beacon	34 4 35	23 3 43	Port Melinda, Vasco de Gama's Pillar	3 12 48	40 11 21
Plettenberg Bay, extr. of Seal Pt.	34 6 20	23 25 0	Lamo Bay, Lamo Castle	2 15 42	40 56 21
St. Francis*	34 12 30	24 50 20	Manda Roads, E. side of Manda Toto I.	2 13 35	40 59 40
Cape Recife*	34 1 44	25 42 12	Port Durnford, Foot Point	1 13 0	41 54 15
PORT ELIZABETH, Lady Donkin's Monument	33 57 43	25 37 24	Kisimayo Bay, S. point of Kisimayo I.	0 23 6	42 33 31
Bird Is.*	33 50 41	26 17 21		Lat. N.	
Port Alfred, signal-staff	33 36 9	26 54 10	Brava, Well	1 6 48	44 3 27
Waterloo Bay, Maitland Signal Hill	33 28 0	27 3 0	Meurka Anchorage, S. point of town	1 42 6	44 53 49
Madagascar Reef, centre	33 23 10	27 20 48	Magadoxa, tower	2 1 48	45 24 39
Cove Rock, centre	33 5 10	27 49 12	Murat Hill, peak	2 30 0	46 7 0
East London*	33 1 45	27 55 2	Ras Hafun, E. extr. of Africa	10 27 0	51 22 20
Cape Morgan, extreme	32 42 0	28 22 36	CAPE GUARDAFUI, E. pt.	11 50 30	51 16 10
Hole-in-the-Wall	32 2 30	29 6 40	Kal Farun Islet, centre	12 26 0	52 8 0
Rame Head, extreme	31 48 15	29 21 15	Abd-al-Kuri I., N.E. point	12 11 15	52 22 20
Cape Hermes, extreme	31 38 6	29 33 16	Socotra I., Tamarida, mosque	12 39 0	53 59 20
Waterfall Bluff	31 26 15	29 48 40	Ras Antareh, extreme of rocky point	11 27 30	49 35 40
PORT NATAL*	29 52 40	31 3 50	Meyet I., centre	11 13 0	47 14 0
Durnford Point, extreme	29 0 12	31 51 39	Port Berbereh*	10 25 0	44 57 24
Cape St. Lucia, extreme	28 32 30	32 27 39	Zeyla, mosque	11 22 0	43 27 20
Cape Vidal, extreme	28 9 36	32 38 10	Ras Sejan, summit	12 28 20	43 14 20
DELAGOA BAY, Reuben Pt.*	25 58 44	32 38 23			
Cape Corrientes, Small rock	24 7 30	35 30 33	Red Sea.		
Inhambane Bay, Barrow Hill*	23 45 30	35 33 10			
Cape St. Sebastian, extreme	22 6 0	35 32 0			
Bazaruto I., N. point	21 31 0	35 33 9			
Chuluwan I.*	20 38 11	34 53 35	Hanfelah Bay, Hanfelah Pt	14 44 0	40 52 0
Sofala, fort, N. side of entr	20 10 42	34 46 0	Disei I., Village Bay	15 28 10	39 45 30
Zambesi River, Kangoni Mouth	18 52 50	36 11 47	Musawwa' Harb., N. point of entrance	15 37 12	39 27 23
Quillimane River*	18 1 24	37 1 30	Khôr Nowarat, Shatireh Islet	18 15 12	38 19 30
Quillimane, town	17 51 50	37 1 9	SUAKIN*	19 7 0	37 19 9
Makemba River, entrance	17 15 0	38 4 0	Makawwa I., S. point	20 44 0	37 15 30
Premeira Is., centre Casuarina I.	17 6 30	39 6 27	St. John's I., peak	23 36 20	36 10 15
Angoxa Is., centre of Hurd I.	16 38 24	39 49 57	Dædalus Shoal*	24 55 0	35 51 0
Mafamale I., centre	16 20 30	40 3 57	Koesair Anchorage, S.W. angle of fort	26 6 24	34 17 3
Port Mokamba, Mokambo Pt.	15 8 0	40 36 12	Brothers' I.*	26 18 50	34 50 30
PORT MOZAMBIQUE, St. George I.*	15 2 12	40 48 39	Safojah I., N.E. summit	26 45 45	33 59 44
Port Mozambique, San Sebastian*	15 00 45	40 44 51	Ashrafi I.*	27 47 21	33 42 27
Cape Cabeceira*	14 58 20	40 45 10	Ras Gharib*	28 20 52	33 6 30
Port Conducia, Bar Point	14 53 0	40 40 0	Zafarana*	29 6 29	32 39 40
Lurio Bay, Pando Point	13 23 40	40 46 0	SUEZ, Telegraph office	29 57 54	32 33 19
Pemba Bay, N. point	12 55 48	40 33 9	Tôr, ruined fort	28 13 47	33 36 56
Querimba Is., Ibo I.*	12 20 0	40 40 0	Sherm Yahar, entrance	27 35 45	35 30 30
Numba I., E. point	11 9 18	40 43 21	Sherm Joobbah, entrance	27 33 0	35 32 30
CAPE DELGADO, extreme	10 41 18	40 41 55	Sherm Wejh*	26 13 0	36 27 0
Msimbati, Rás Matunda	10 19 22	40 26 34	Sherm Hassejy, anchorage	24 38 35	37 17 45
Mikindini Harbour, Kinizi	10 16 31	40 10 33	Yembó, anchorage	24 5 15	38 2 45
Mgan Mwania, Madjori Rock	10 6 43	40 2 14	Sherm Rábigh, anchorage	22 43 50	39 0 30
Lindi River, fort flag-staff	9 59 30	39 46 41	JIDDAH, Jezirah el Mifsaka Island	21 28 0	39 10 37
Mchinga Bay, obs. spot	9 44 22	39 47 7	Lith, Agha Islet	20 9 0	40 12 0
Kiswere Harbour, Rustmigi	9 25 36	39 39 31	Jelalil, anchorage	19 55 30	40 30 0
Kilwa Kisiwani, obs. spot E. of village	8 57 32	39 30 54	Kunfidah, islet	19 7 40	41 3 20

X. East Coast of Africa and the Red Sea—*continued.*

Places.	Lat. N.	Long. E.
Red Sea—*continued.*	° ′ ″	° ′ ″
Khor Nohud, entrance	18 15 50	41 27 30
Farisan I., anchorage, Jebul Mandhakh	16 50 0	41 58 0
Gizau, fort	16 53 0	42 29 0
Loheyyah, hill fort	15 42 0	42 38 45
Kamarán Bay, harbour	15 20 30	42 34 0
Hodeïdah Road	14 47 0	42 54 0
Jebel Zukur I., N. point	14 3 53	42 45 28
MOCHA, pier end	13 19 50	43 12 58
Perim I.*	12 38 59	43 25 6

XI. Islands of the Indian Ocean.

	Lat. N.	Long E.
Betrapar Islet	11 35 0	72 54 40
Kalpeni Islet, S. end	10 3 0	73 35 0
Minikoi Islet, S. end	8 15 0	73 0 0
Kee-lah I., N. end	6 59 0	73 12 0
Malé, or King's I., flag-staff	4 10 20	73 29 0
	Lat. S.	
Addu Atoll, N.W. point	0 35 0	73 10 0
Amirante Is., Ile des Roches	5 41 0	53 42 0
SEYCHELLE Is., S. end of Platte Island	5 53 0	55 27 0
Seychelle Is., Port Victoria, end of Hodoue Jetty	4 37 15	55 27 49
Seychelle Is., Bird I.	3 40 0	55 15 0
CHAGOS Is., Peros Banhos, Diamond Islet	5 15 0	71 42 57
Diego Garcia, N. end, Middle I.	7 13 30	72 23 0
Cargados Carajos, Establishment I., flag-staff	16 25 12	59 46 40
Rodriguez I., Mathurina Bay, Point Venus	19 40 23	63 25 0
MAURITIUS I., Flat I.*	19 52 36	57 39 8
Cannonier Point *	19 59 45	57 32 30
Mauritius I., Port Louis, Martello tower, Ft. George	20 8 37	57 29 32
Grand Port, Fouquet I *	20 24 20	57 47 9
Réunion I., St. Denis *	20 51 32	55 30 10
Réunion I., St. Pierre *	21 19 50	55 28 39
Tromelin I., N. end	15 51 37	54 28 46
Agalegas I., N.W. point	10 21 30	56 32 0
Farquhar Is., Hall's house	7 1 45	51 10 24
Alphonse I., N. point	7 1 0	52 47 0
Coetivy I., N. end	7 6 0	56 22 0
Madagascar.		
CAPE ST. MARY, S. extr.	25 39 10	45 6 50
Cape St. Vincent, extreme	21 54 24	43 20 21
Cape St. Andrew, extreme	16 12 10	44 29 5
Majambo Bay, W. point	15 11 42	46 59 20
Narinda Bay, Moormora Point	14 40 18	47 26 27
Port Radama, Point Blair	13 59 0	47 58 21
Nossi Bé, Hellville jetty	13 23 25	48 16 0
Cape Amber, N.E. extreme	11 57 30	49 18 45
Cape East, Ugoncy I.	15 15 48	50 31 21

Madagascar—*continued.*	Lat. N.	Long. E.
TAMATAVE, landing-place	18 9 54	49 28 10
Fort Dauphin, flag-staff	25 1 37	47 2 7
Islands in Mozambique Channel, &c.		
Europa I., centre	22 22 30	40 24 10
Bassas da India, E. point	21 29 0	39 40 39
Geyser Reef, S.E. extreme	12 26 30	46 32 30
Mayotta I.*	12 46 43	45 19 39
Johanna I., landing-pl., Pomoni Harbour	12 16 20	44 24 54
Mohilla I., Numa Choa Harb.	12 25 0	43 47 0
Glorioso Is., W. islet	11 34 48	47 24 9
COMORO I., islet in Mauroni Bay	11 40 44	43 19 15
Assumption I., Hummock	9 46 20	46 31 10
Aldabra I., W. side of main channel entrance	9 22 35	46 14 55
Cosmoledo Is., obs. islet	9 41 20	47 32 28
Prince Edward's Is., Boot Rk.	46 43 0	37 44 0
Marion I., N. Cape	46 53 0	37 33 0
CROZET Is., Penguin Is., centre of S.W. islet	46 36 0	50 41 30
Possession I., N.W. point	46 22 0	51 30 15
Twelve Is., summit N.E. island	46 1 0	50 40 0
Navire Bay	46 28 18	51 50 0
Hog I., summit	46 10 40	50 35 0
East I., centre	46 26 0	52 13 0
KERGUELEN Is., Christmas Harbour	48 40 0	69 4 0
Kerguelen Is., Bligh's Cape	48 26 45	68 48 20
Kerguelen Is., Cape Bourbon	49 42 0	68 54 0
Kerguelen Is., Port Royal Sound, U. S. Tr. of V. Observatory, 1874	49 21 22	70 4 31
Kerguelen Is., Cape Challenger	49 41 0	70 15 0
Kerguelen Is., Balfour Rock	49 29 0	70 29 50
HEARD I., N.W. end Cape Laurens	53 2 45	73 15 30
Heard I., Sealing-station	53 13 0	73 52 0
Heard I., summit McDonald Island	53 2 50	72 31 45
St. Paul's I., Ninepin Rock	38 42 45	77 35 0
Amsterdam, summit	37 51 0	77 31 30
Keeling or Cocos Is., Port Refuge, Direction I.	12 6 22	96 54 45
Christmas I. (Approximate)	10 31 0	105 33 0
Max. S. lat. attained by Sir J. Ross	78 11 0	...

XII. South Coast of Asia.

Arabia, &c.	Lat. N.	Long. E.
ADEN, Telegraph station	12 46 40	44 58 37
Makalleh Bay, flag-staff	14 31 40	49 3 20
Ras Fartak, extreme point	15 38 0	52 14 20
Kuria Muria Is., Hulla Niyeh I., N.E. bluff	17 32 45	56 3 24
Masirah I., Point Abu-rasas	20 10 0	58 36 30
Ras-al-Hed, extreme point	22 32 40	59 48 0
Maskat, Maskat Point	23 38 0	58 30 50
Great Quoin Islet, centre	26 30 0	56 31 40
Bahrain Harbour, Portuguese fort	26 13 53	50 31 45
Basrah, custom-house f.-s	30 32 0	47 51 28
Kuweit Harb., N. end of town	29 22 56	47 59 5
Básidûh, chapel	26 39 12	55 16 15
Chahbar Bay, telegraph office	25 16 43	60 37 7

XII. South Coast of Asia—*continued.*

Places.	Lat. N.	Long. E.
	° ′ ″	° ′ ″
Gwadar Bay, telegraph office	25 7 19	62 19 10
Cape Monze, peak	24 50 3	66 39 58
Hindostan.		
KURRACHEE, Manora *	24 47 21	66 58 47
Kurrachee, Observatory	24 49 49	67 1 33
Mandavi *	22 49 41	69 20 51
Beyt, or Bet *	22 29 0	69 5 2
Dwarka *	22 14 0	68 57 32
Dwarka, Temple spire	22 14 3	68 58 1
Porebander *	21 37 10	69 35 32
Mangarol *	21 6 0	70 7 2
Diu Island, Portuguese fort	20 42 40	70 59 29
Mowa *	21 2 21	71 50 2
Perim I.*	21 35 54	72 21 9
Cambay, flag-staff	22 17 0	72 35 10
Surat River, Tapti *	21 5 20	72 38 2
Surat, Minaret Adrusah	21 12 19	72 49 27
Bassein, centre of town	19 20 10	72 48 44
BOMBAY, Observatory	18 53 45	72 48 58
Bankot, Fort Victoria	17 58 19	73 2 31
Ratnagherry, fort	16 59 42	73 16 13
Viziadroog, fort flag-staff	16 33 32	73 19 15
Cape Ramas, W. bastion of fort	15 5 12	73 54 57
GOA, St. Denis Church	15 21 24	73 54 0
Goa, Agoada *	15 29 26	73 46 27
Vingorla, signal-station	15 51 14	73 36 54
Vingorla Rocks *	15 53 16	73 27 17
Sedishigar Bay, Oyster Rock *	14 49 25	74 3 22
Coompta *	14 25 10	74 23 27
Hináwar, monument	14 17 28	74 26 40
Cuadapur, custom-house	13 37 28	74 40 10
Mangalore *	12 52 17	74 50 40
Cananore *	11 51 10	75 22 17
Tellicherry *	11 44 50	75 29 2
Mahé, flag-staff	11 42 10	75 31 44
Calicut *	11 15 5	75 46 7
Coclim *	9 57 47	76 14 17
Alipee *	9 30 0	76 19 32
Quilon, f.-s. on W. point	8 53 25	76 35 30
Trevandrum, Observatory	8 30 47	76 56 45
CAPE COMORIN *	8 4 0	77 33 11
Trichendore, Pagoda on point	8 29 55	78 7 47
Tuticorin *	8 47 10	78 11 52
Paumben Pass *	9 17 14	79 13 10
Ceylon.		
Manaar, centre of town	8 59 0	79 53 52
COLOMBO, clock tower in fort	6 55 40	79 51 12
Dondra Head, extreme	5 55 0	80 34 12
Point de Galle	6 1 25	80 13 34
Great Bassas Rocks *	6 10 10	81 28 32
Little Bassas Rocks *	6 22 55	81 43 44
Batticaloa *	7 43 50	81 41 52
TRINCOMALEE, Dock-yard flag-staff	8 33 30	81 13 42
Hindostan.		
Calymere Point *	10 17 55	79 52 2
Negapatam *	10 45 30	79 50 52
Pondicherry, flag-staff	11 55 57	79 50 3
MADRAS, Observatory	13 4 6	80 14 51
Pulicat *	13 25 15	80 19 38
Armogham *	13 52 50	80 12 15
Point Divy *	15 58 44	81 9 21
Masulipatam, flag-staff	16 9 8	81 9 8
Coconada *	17 0 40	82 17 2
Vizagapatam, fort flag-staff	17 41 34	83 17 42
Calingapatam, flag-staff	18 20 36	84 7 29
Gopaulpore *	19 13 0	84 52 0

Places.	Lat. N.	Long. E.
	° ′ ″	° ′ ″
Hindostan—*continued.*		
Ganjam, fort	19 22 30	85 3 29
Juggernath, Great Temple	19 48 17	85 49 9
False Point *	20 20 15	86 47 30
Balasore, spire	21 30 12	86 55 46
Saugor I.*	21 38 43	88 2 32
Diamond Harbour, flag-staff	22 11 10	88 11 7
CALCUTTA, Fort William semaphore	22 33 25	88 20 11
Burmah.		
Chittacong, Judge's Court	22 21 3	91 50 14
Akyab, Oyster Reef *	20 5 0	92 39 0
Akyab, Old temple	20 8 53	92 52 40
Ramree I., S. point	18 51 0	93 56 30
Chedubah I., N.W. peak	18 50 30	93 31 0
Cape Negrais, extreme	16 1 30	94 13 16
Bassein River, Alguada Reef *	15 42 14	94 12 7
BASSEIN, Port Dalhousie	16 1 30	94 23 0
Andaman Is., Great Coco I.*	14 12 30	93 22 47
Andaman Is., Port Cornwallis, rock in entrance	13 18 40	92 57 10
Andaman I., Port Blair, Settlement	11 41 13	92 45 14
Andaman Is., Little Andaman I., S.E. point	10 27 0	92 31 10
Krishna Shoal *	15 36 30	95 29 45
Rangoon River, Grove Point *	16 30 1	96 23 19
Rangoon, Great Dagon pagoda	16 46 0	96 7 30
MAULMAIN, Docks	16 26 0	97 38 0
Maulmain River, Amherst Pt. pagoda	16 4 44	97 33 3
Double I.*	15 52 30	97 35 8
Tavoy River, Tavoy Pt. pagoda	13 32 0	98 12 0
Mergui, pagoda	12 26 45	98 35 0
Tenasserim	12 6 0	99 3 0
St. Matthew I., Hasting's Har.	10 5 5	98 10 15
Pak Chan River, Victoria Point	9 51 30	97 31 0
Malaysia.		
Tonkah Harb., Tunkseylm I., Harbour-master's office	7 51 12	98 24 0
Pulo Penang, Fort Cornwallis	5 24 30	100 20 9
DINDING I., Port Pancore	4 13 19	100 34 8
Cape Rachada *	2 24 8	101 51 2
MALACCA, flag-staff	2 11 30	102 15 36
Singapore Strait, Coney I.*	1 9 51	103 44 50
SINGAPORE, Fullerton Battery	1 17 20	103 51 18
Singapore Strait, Pedra Bianca *	1 19 57	104 24 30
Singapore Strait, summit Bintang great hill	1 4 20	104 27 24
Rhio Straits, Pulo San *	1 3 13	104 10 8
Rhio Straits, Terkolei *	0 57 21	104 19 34
Rhio Straits, Little Garras *	0 44 30	104 21 19
Bintang I., Residency f.-s.	0 55 50	104 25 43
Pitong I., peak	0 36 52	104 4 24
Abang Besar I., N. point	0 36 30	104 11 13
	Lat. S.	
Lingga I., flag-staff	0 12 34	104 35 56
Singkep I., mountain summit	0 26 13	104 30 15
Menaloe I., N. point	0 57 51	105 38 2
	Lat. N.	
Nicobar Is., Car Nicobar, N. point	9 15 40	92 48 0
Nicobar Is., Nancowry Harb., Naval Point	8 2 10	93 29 42
Nicobar Is., Great Nicobar, W. point of Galatea Bay	6 46 20	93 49 20

XII. South Coast of Asia—*continued.*

Places.	Lat. N.	Long. E.
Sumatra.	° ′ ″	° ′ ″
ACHEEN HEAD, Pulo Brasse *	5 44 55	95 4 47
Acheen Head, N. extreme	5 34 40	95 19 0
Diamond Point *	5 15 58	97 29 53
	Lat. S.	
Cape Baroe, extreme	0 0 32	103 47 40
Palembang, Residency f.-s.	2 59 26	104 45 16
Blimbing Bay	5 55 2	104 32 36

Places.	Lat. S.	Long. E.
Sumatra—*continued.*	° ′ ″	° ′ ″
BENKOELEN, Fort Marlborough	3 47 28	102 14 27
Padang, Apenberg flag-staff	0 58 1	100 20 13
Batoe Is., N. point of Simoe Islet	0 3 13	98 5 55
	Lat. N.	
Nias I., Lagoendi Bay	0 34 47	97 43 25
Siboga, flag-staff	1 44 24	98 45 50

XIII. East Coast of Asia.

Bangka Strait, &c.	Lat. S.	Long. E.
JAVA HEAD, First Point *	6 43 52	105 11 40
SUNDA STRAIT, Krakatoa I., peak	6 8 46	105 26 40
North Watcher Island *	5 13 30	106 26 20
Bangka Strait, Lucipara I. beacon	3 13 5	106 12 44
Bangka I., Tobol Ali Fort	3 0 48	106 27 25
Bangka Strait, Nangka I., W. rock	2 22 53	105 45 24
Bangka I., Mintok *	2 4 18	105 9 12
Bangka I., Blinyoe	1 38 26	105 46 10
Bangka I., Crassok Point	1 29 0	106 57 30
Gaspar Strait.		
Gaspar Strait, Shoalwater I.	3 18 15	107 13 3
Gaspar Strait, Bulo Lepar *	2 56 14	106 54 30
Gaspar Strait, Pulo Jelaka *	2 51 48	107 0 55
Billiton I., Tanjong Pandan flag-staff	2 44 40	107 38 28
Billiton I., Bienga Point *	2 35 30	107 38 16
Gaspar I., peak	2 24 30	107 3 15
Entrance of China Sea.		
Carimata I., Sharp peak	1 35 52	108 53 21
Pulo Eu, centre	2 7 0	104 17 0
Pulo Aor, S. peak	2 26 30	104 32 0
	Lat. N.	
St. Barbe I., centre of W. side	0 7 26	107 11 40
Directon I., S. point	0 14 19	108 1 50
Datu I., N.E. part	0 8 11	108 36 10
St. Julian I., N.E. part	0 55 22	106 44 0
Tambelan I., S. point	0 56 52	107 42 29
Tambelan I., Tambin I. obs. stn.	1 0 27	107 24 10
Victory I., S. point	1 34 41	106 18 30
Anamba Is., White rock	2 20 0	105 34 0
Anamba Is., Pulo Repon	2 25 0	105 52 0
Anamba Is., Pulo Domar	2 45 0	105 25 0
St. Pierre Rock, S. point	1 51 42	108 39 0
Natuna Is., pyramidal rocks	4 3 0	107 21 40
Natuna Is., Semione I.	4 31 0	107 42 30
Pulo Varela, centre	3 18 0	103 38 0
Pulo Brala, centre	4 49 0	103 38 0
Bangkok, Old British Factory	13 44 20	100 28 42
Saigon, Observatory	10 46 47	106 41 14
Cape St. James *	10 19 40	107 3 59
Cape Padaran, extreme	11 21 0	108 58 0
Cape Varele, extreme	12 55 0	109 24 30
China Sea.		
Condore Is., Largest I., landing-place in Great Bay	8 40 57	106 36 10
Safatu I., summit	9 58 23	109 6 0
Ceicer de Mer I., S.W. hill	10 32 36	108 56 30
Natuna Is., Murundum I., S.E. point	2 2 55	109 6 10
Natuna Is., Low I.	3 0 0	107 48 0

China.	Lat. N.	Long. E.
Hai-Phong, Obs. pagoda	20 51 43	106 39 22
Ha-Noi, citadel tower	21 1 57	105 48 40
Pak-Hoi, custom-house f.-s.	21 29 0	109 6 0
Hainan I., Cape Bastion, extr.	18 9 30	109 33 30
Hainan I., Gaalong Bay, E. Brother	18 11 30	109 41 30
Hainan I., Tinhosa I., S. hill	18 39 45	110 28 0
Hainan I. Hoi-how Fort	20 3 10	110 19 30
Hainan I., Hainan Head	20 12 0	110 44 0
Paracel Is., Triton I.	15 46 0	111 11 0
Paracel Is., Obs. bank	16 36 0	111 40 30
Paracel Is., Lincoln I., S. E. pt.	16 39 34	112 44 20
Paracel Is., Woody I.	16 50 30	112 19 0
Pratas I., N.E. part	20 42 3	116 43 22
MACAO, Fort Guia *	22 11 0	113 33 30
CANTON, Dutch Folly *	23 6 35	113 16 34
Raleigh Rock, centre	22 2 0	113 47 0
HONG KONG, cathedral	22 16 27	114 9 31
Hong Kong, Wellington Btry.	22 16 23	114 10 2
Lema I., Lema Head	22 3 40	114 19 25
Nine-pin Rock, centre	22 15 45	114 22 7
BREAKER POINT, extreme	22 56 0	116 27 45
Cape of Good Hope, extreme	23 14 0	116 47 0
Swatow, Double I.	23 20 0	116 43 20
Lamok I. *	23 14 50	117 17 30
Brothers Islets, S.E. islet	23 32 30	117 42 0
Chapel I. *	24 10 18	118 13 30
AMOY, Hausen I. pagoda	24 28 20	118 3 0
Dodd I., summit	24 26 16	118 29 4
Chinchin Harbour, Pisai Islet	24 49 13	118 41 0
Pyramid Point, extreme	24 52 12	118 58 0
Ockseu I. *	24 59 0	119 27 30
Sorrel Rock, summit	25 2 18	119 10 36
Lamyit I., High Cone Peak	25 12 0	119 35 0
Hungwha Channel, Sentry I.	25 16 30	119 45 0
Turnabout I. *	25 26 0	119 58 42
White Dogs I. *	25 58 20	120 2 20
MIN RIVER, pagoda, Losing Island	25 59 0	119 27 16
Min River, Temple Point	26 8 26	119 37 42
Alligator I., summit	26 9 0	120 26 0
Tung-ying Is., peak	26 23 12	120 31 0
Cony I., summit	26 30 0	120 10 0
Double Peak I., highest peak	26 36 6	120 11 12
Pih-seang I., Town I.	26 42 30	120 22 42
Dangerous Rock, summit	26 53 0	120 34 18
Tae Is., E. islet	26 59 12	120 43 48
Nam-quan Harbour, Bate I.	27 9 20	120 25 50
Ping-fong I., summit	27 9 42	120 32 42
PIH-QUAN PEAK, summit	27 18 48	120 28 42
Port Namki, E. horn	27 26 18	121 6 36
Pih-ki-shan I., summit	27 37 18	121 12 18
Pe-shan Is., summit	28 5 30	121 31 48
Tung-chuh Islet, summit	28 42 12	121 5 56
Kweshan Is., Patahecock	29 21 54	122 13 42
Nimrod Sound, middle islet	29 34 20	121 43 15
Tong-ting Islet, summit	29 51 42	122 35 48
Chin-hai, citadel	29 57 8	121 43 6

XIII. East Coast of Asia—*continued.*

Places.	Lat. N.	Long. E.
China—*continued.*	° ′ ″	° ′ ″
NING-PO, Tiger I.*	29 57 43	121 43 51
Chusan Is., Ting-hai Harbour.	30 0 25	122 5 18
Video I., summit	30 8 0	122 46 0
West Volcano I.*	30 20 25	121 51 45
Chapu, battery	30 36 0	121 3 0
GUTZLAFF Is.*	30 47 38	122 10 0
Saddle Is., N. Saddle*	30 50 20	122 40 0
Barren Is., centre	30 43 0	123 7 14
SHANGHAI, English Consulate flag-staff	31 14 42	121 28 55
Woosung, lt.-ho. (left bank)	31 23 22	121 29 35
Shaweishan I.*	31 24 30	122 14 15
Pescadores I., Fisher I.	23 32 53	119 28 7
Pescadores I., second point on N. side of Makung Harbour.	23 32 54	119 30 12
FORMOSA I., S. cape	21 55 0	120 50 30
Formosa I., Takau, Saracen Head	22 36 14	120 16 33
Formosa I., Port Heongsan	24 46 0	120 55 0
Formosa I., Tam-sui Harbour, White Fort	25 10 24	121 25 0
Formosa I., Kelung Harb., S. shore	25 8 25	121 45 30
Formosa I., San-o Bay, beach near village	24 35 28	121 49 27
Botel Tobago Sima, S. extreme	22 1 40	121 39 45
Sarawak*	1 43 50	110 30 30
Cape Sirik	2 46 0	111 21 0
Brunî River, Palace	4 52 40	114 55 20
LABUAN I., Victoria Harb., Raussey Point flag-staff	5 16 33	115 15 15
Balabac I., peak	7 55 50	117 3 0
Palawan I., Cape Bovlliluyan, S. extreme	8 20 25	117 9 40
Palawan I., Victoria Peak	9 22 30	118 17 30
Philippine Islands.		
Busuanga I., Mt. Tundalara	12 2 9	120 12 11
Apo Islet, summit	12 39 46	120 27 18
Caluya I., summit	11 54 28	121 31 40
Semerara I., N.W. bluff	12 5 38	121 19 3
MINDORO I., Manguiram Beach	12 21 20	121 3 48
LUZON I., Port Cavite, Naval headquarters	14 28 55	120 54 4
Luzon I., Manila*	14 35 41	120 56 33
Luzon I., Manila, cathedral	14 36 3	120 57 18
Luzon I., Cape Bojeador, extr.	18 29 30	120 32 25
Luzon I., Cape Engano, Roña Islet	18 32 2	122 5 5
Balingtang Is.	19 58 30	122 14 0
Batan I., Mount Irada	20 28 30	122 1 20
Ibayat I., Mount Santa Rosa	20 48 0	121 52 30
Cebu I., Cebu fort	10 17 35	123 53 24
Mindanao I., Cape St. Augustin	6 14 30	125 47 48
Mindanao I., Sibuco Bay, hill S. of beach	7 18 5	122 3 18
Sulu Islands.		
Sombrero Rock, centre	10 43 0	121 33 0
Piedra Blanca, centre	10 27 0	121 3 0
Sibutu I., hill on E. coast	4 49 30	119 48 0
Sulu I., Maimbun Anchorage, dry bank	5 54 45	121 0 40
Sulu I., Dalrymple Harbour, Tulyan Islet	6 2 30	121 18 20
Basilan I., La Isabela	6 42 43	121 56 50
Sandakin Harb., Bahalatolis I.	5 50 0	118 11 0
	Lat. S.	
Celebes I., Macasser, fort *f.-s.*	5 8 8	119 23 41
Java.		
Anjer, Fourth Point*	6 4 18	105 52 30
Bantam, flag-staff	6 1 20	106 8 20
BATAVIA, Observatory	6 7 40	106 48 8
Samarang, Lookout station	6 58 2	110 25 6
Sourabaya, citadel tower	7 13 34	112 43 58
Sourabaya, time-ball station	7 12 10	112 43 40
Madura I., Bangkalan	7 1 30	112 44 28
Cape Anjoe, extreme	7 25 0	106 24 30
Islands, &c.		
Bali I., Bliling*	8 4 0	115 5 50
Lombok I., peak	8 23 0	116 27 30
Sumbawa I., Bima flag-staff	8 27 0	118 43 55
Lucipari Is., N. islet	5 28 30	127 30 0
Timor I., Deli custom-house	8 34 0	125 33 39
Timor I., Koepang, Fort Concordia	10 9 49	123 33 39
Rotti I., W. point	10 46 0	122 52 0
Saru I., Seba Bay, on N.W. side	10 29 0	121 46 0
Sandalwood I., Nangamessie	9 35 3	120 14 30
Wetter I., Sanw village	7 56 0	126 24 0
Roma I., W. point	7 38 0	127 19 0
Moa I., Buffalo Peak	8 12 0	128 1 0
Sermalta I., N.E. point	8 14 0	129 0 0
Nila I., centre	6 44 0	129 29 0
Mano or Bird I., centre	5 33 0	130 20 0
Timor Laut I., Olilet, E. coast	7 55 0	131 23 30
Arru Is., S. islands	7 10 0	134 24 0
Banda I., Mole	4 31 53	129 53 0
Ceram I., Kawa	2 55 52	128 6 46
Amboina I., fort flag-staff	3 41 30	128 9 58
Gillolo I., S. point	0 50 0	128 23 0
	Lat. N.	
Molucca Is., Ternate I., Residency flag-staff	0 47 13	127 22 21
Meiaco-Sima Is., Kumi I., N. beach	24 26 0	122 56 0
Meiaco-Sima Is., Port Haddington, Hamilton Point	24 25 0	124 6 40
Raleigh Rock, summit	25 55 0	124 35 0
Lu-Chu Is., Yori-Sima	27 2 0	128 25 24
Lu-Chu Is., Oho-Sima, N. extr.	28 31 40	129 42 30
China.		
Staunton I., landing-place, N. side	36 45 29	122 16 19
Shantung Promontory, extr.	37 24 30	122 42 30
CHE-FOO*	37 34 10	121 31 30
Che-foo Harb., fort in vil. bay.	37 36 0	121 26 21
Pei-Ho River, S. Taku Fort, S. Cavalier	38 58 16	117 42 48
Tientsin, shore opposite N.E. angle of wall	39 9 0	117 11 44
Newchang, pagoda	40 43 12	122 14 14
Lian-ti-shan Promontory, S.W. point	38 43 0	121 8 0
Round I., summit	38 40 0	122 11 30
Corea.		
Barren I., centre	35 21 0	125 58 0
Modeste I., N. peak	34 42 30	125 16 0
Kuper Harbour, N.E. extreme of Josling I.	34 17 20	126 35 28
Port Hamilton, W. pt. of Obs. I.	34 1 23	127 18 34
Bate Is., summit Thornton Islet	33 57 0	126 18 0

XIII. East Coast of Asia—*continued.*

Places.	Lat. N.	Long. E.
Corea—*continued.*	° ′ ″	° ′ ″
Quelpart Is., Beaufort I., middle of W. side	33 29 40	126 58 25
Japan.		
Iki Sima, summit, S. end of I.	33 44 30	129 42 30
Goto I., Ose Saki *	32 36 45	128 36 6
Pallas Rocks, S. rock	32 18 12	128 4 39
Meac Sima, Ears Peak	32 3 0	128 25 0
Nagasaki, Minage Point	32 44 28	129 51 13
Kagoshima *	31 32 5	130 30 21
Udsi Sima, high peak	31 12 0	129 29 0
Satano Misaki *	30 58 0	130 40 0
Linschoten Is., Suwa Sima, Volcano	29 38 0	129 43 0
TOKIO, Naval Observatory	35 39 17	139 44 57
Simonoseki, Moso Saki, S. part.	33 58 0	130 58 24
Shirasu Reef *	33 59 11	130 47 56
Susaki, S.W. battery	33 23 19	133 16 31
Hiogu, Wada Misaki *	34 40 0	135 12 0
Kobé, W. Camber	34 41 18	135 11 14
Osaka, Fort Temposan *	34 40 0	135 27 0
Sakai *	34 35 12	135 27 44
Osaki Bay, Tree Islet, S. point	34 7 42	135 8 14
Oö Sima Harbour, Kashinosaki E. point	33 28 15	135 52 10
Goza Harbour, O. Sima Islet	34 13 52	136 48 21
Simoda Harbour, Centre I.	34 39 49	138 57 30
Yokoska Harb., Eyi Yama Pt.	35 17 30	139 39 43
YOKOHAMA, Vict depôt f.-s.	35 26 14	139 39 13
Broughton Rocks, summit	33 39 0	139 17 45
Lot's Wife Rock, summit	29 47 0	140 22 30
Yamada Harbour, Ko Sima	39 27 17	141 59 0
Siriya Saki *	41 26 10	141 29 25
Awomori *	40 51 45	140 45 15
Fushiki Harbour *	36 47 47	137 3 42

Places.	Lat. N.	Long. E.
Japan—*continued.*	° ′ ″	° ′ ″
Oki Is., N. point	36 30 0	133 23 0
Hakodadi, entrance to Kamida Creek	41 47 8	140 43 44
Iturup I., N. E. point	45 38 30	149 14 0
Broughton I., summit	46 42 30	150 28 30
Cape Clunard, extreme	36 5 45	129 33 30
Fort Lazaref, S. end of Bontenef Island	39 20 42	127 32 48
Siberia.		
Port Novogorod *	42 33 40	131 10 0
Wrangel Bay	42 44 18	133 2 3
Port Olga *	43 22 0	135 15 0
St. Vladimir Bay, Orekhera Pt.	43 53 40	135 27 21
Imperial Port, Cape Mouvarieff *	49 0 0	140 27 0
Castres Bay, Quoin Point *	51 26 0	140 52 0
Saghalien I., Cape Notoro, S. pt.	45 54 15	142 9 30
Saghalien I., Cape Giretoko, extreme	46 1 20	143 26 30
Saghalien I., Cape Elizabeth, N. point	54 24 30	142 46 30
Okhotsk, battery	59 19 45	143 7 14
Cape Lopatka, extreme	51 2 0	156 50 0
PETROPAULOVSKI *	52 57 32	158 43 37
Behring I., Cape Khitroff	54 56 0	166 43 0
Cape Kamchatka, extreme	56 10 0	163 25 0
Cape Navarin, extreme	62 16 0	179 4 30
		Long. W.
St. Matthew I., Cape Upright, S. E. point	60 18 0	172 4 0
Cape Behring, extreme	65 0 30	175 57 0
East Cape, extreme	66 8 0	169 44 0

XIV. Islands of the North Pacific.

	Lat. N.	Long. W.
Malpelo I., summit	4 8 0	81 36 0
Cocos I., head of Chatham Bay	5 32 57	86 58 22
Galapagos Is., Redondo Rock, summit	0 13 30	91 8 0
Galapagos Is., Culpepper I., summit	1 22 59	91 49 30
Christmas I., N. point of Cook Islet	1 57 17	157 27 46
Fanning's I., f.-s., entrance to English Harbour	3 51 26	159 23 35
Washington I., village, W. end	4 41 10	160 18 5
Palmyra I., S.E. islet	5 49 4	162 10 32
Baker I., centre	0 13 30	176 30 45
Howland Is., Centre I.	0 49 0	176 41 15
Gilbert Islands.	Lat. S.	Long. E.
Arorai or Hurd's I., S. pt.	2 40 54	177 1 13
Tamana I., centre	2 35 0	176 7 0
Tapouteona or Drummond I., S. E. point	1 29 14	175 12 20
Nukunan or Byron I., S.E. pt.	1 23 42	176 31 35
Peru or Francis I., N.W. pt.	1 17 14	175 57 9
Nononti or Sydenham I.	0 36 0	174 24 0
	Lat. N.	
Aranuka or Henderville I.	0 11 0	173 39 20
Apamana or Hoppers I., entrance islet	0 23 0	173 52 0
Mariana I., S. point	0 51 30	173 3 30

Gilbert Islands—*continued.*	Lat. N.	Long. E.
Tarawa I., N.E. point	1 38 45	173 3 0
Apiang I., S. point	1 44 15	173 7 0
Maraki I., N. point	2 3 0	173 25 30
Taritari I., S. point	3 1 30	172 45 40
Marshall Islands.		
Ebon Atoll, Rube Point	4 35 25	168 42 10
Jaluit or Bonham Islands., S. point	5 47 0	169 36 0
Mulgrave Is., Port Rhin, N. point of entrance	6 14 0	171 46 0
Majuro or Arrowsmith Is., S.E. point	7 5 0	171 23 54
Arhno Atoll, N.E. point	7 9 17	171 56 30
Odia Is., S. islet	7 15 0	168 46 0
Namu Is., S. islet	7 46 0	168 23 0
Jabwat I., centre	8 27 0	168 26 0
Aurh or Ibbetson I., N.E. end, anchorage	8 19 0	171 9 0
Maloclab Is., N.W. end Karen Islet	8 54 21	170 49 0
Wotje or Romanzoff Is., Christmas Harbour	9 28 9	170 16 5
Litkieh I., N.W. point	10 3 40	169 1 57
Ailuk Is., Capeniur Islet	10 17 25	169 59 20
Bigar Islet, centre	11 48 0	170 7 0
Kongelab or Pescadores Is., centre of group	11 19 21	167 24 57
Rongerik or Radakala Is., E. point	11 26 45	167 14 20
Ailinginae I., S.W. extreme	11 8 20	166 26 30

XIV. Islands of the North Pacific—*continued.*

Places.	Lat. N.	Long. E.
Marshall Islands—*cont.*	° ′ ″	° ′ ″
Bikini or Eschscholtz I., W. extreme	11 40 0	166 24 25
Wottho or Schanz I., centre	10 5 0	166 4 0
Eniwetok Is., North, or Arthur Island	11 40 0	162 15 0
Ujilong or Providence I., centre of Atoll	9 39 0	161 8 30
Greenwich I., Northern Islet	1 4 0	154 47 55
Caroline Islands.		
Matelotas Group, eastern of the S. Is	8 18 30	137 33 30
Yap I., Harb. in Torrid Bay	9 29 42	138 10 54
Eau I., centre	9 52 30	139 42 0
Uluthi or Mackenzie Is., Mogmog Islet	10 6 0	139 46 0
Feys or Tromelin I., E. extr	9 46 0	140 35 0
Sorol or Philip Is., centre	8 6 0	140 52 0
Eauripik or Kama Is., E. islet	6 40 0	143 11 0
Oleai Group, Raur Islet, N. pt.	7 21 15	143 56 45
Ifalik or Wilson Islets, N. end	7 15 0	144 31 0
Faraulep I., S. end	8 35 0	144 36 0
W. Fain Islet, centre	8 3 0	145 50 0
Olimarao Islet, centre	7 43 30	145 55 45
Toass I., centre	7 29 30	146 24 30
Satawal I., centre	7 22 0	147 6 48
Coquille or Pikelot I., centre	8 9 0	147 42 0
Suk or Pulvauk I., centre	6 40 0	149 16 0
Los Martires, Ollap Islet, N. pt.	7 38 0	149 27 30
Namounito Is., Magur Islet	8 59 45	150 14 30
Hall I., Namuine Islet	8 25 30	151 49 15
Hogoen Group, N. end of Tsis Islet	7 18 30	151 56 30
Namolouk Is., N.W. islet	5 55 0	153 13 30
Mortlock Is., Lukanor, Port Chamisso	5 29 20	153 58 0
Nukuor or Monteverde Is., E. point	3 51 0	155 0 54
Oraluk or Borolelaise I., cen	7 39 0	155 5 0
Ngatik or Valientes Is., E. extr.	5 47 30	157 32 0
Ponapi I., Kiti Hr., Narmaur I.	6 47 0	158 19 0
Mokil or Duperry Is., Aoura, N.E. point	6 41 45	159 50 0
Pingelasp or Mac Askill Is., N. islet	6 12 50	160 47 20
Ualan or Strong I., Coquille Hr.	5 21 20	163 1 0
Pelew Islands.		
Angaur I., S.W. point	6 53 55	134 5 24
Pelelew I., S. point	7 2 0	133 18 8
Errakong or Akamokan I., cen.	7 8 0	134 27 0
Korror Is., Korror Harbour, Malakal pier	7 19 0	134 31 45
Baubeltaub I., Cape Artingal	7 40 30	134 39 30
Kyangle Islets, cen. of largest	8 8 0	134 17 0
Tabi or Lord North I., centre	8 8 0	131 8 0
Mariana Islands.		
Guam I., Fort Sta. Cruz., San Luis d'Apra	13 25 48	144 39 30
Rota I., summit	14 7 30	145 13 4
Tinian I., Sunharon village	14 59 22	145 36 20
Saypan I., Magicienne Bay, landing	15 8 30	145 43 55
Saypan I., Tanapag Harbour, Garapag	15 17 10	145 42 50
Anataxan I., centre	16 20 0	145 39 0
Sariguan I., centre	16 41 0	145 47 0

Places.	Lat. N.	Long. E.
Mariana Islands—*cont.*	° ′ ″	° ′ ″
Guguan I., centre	17 17 0	145 57 0
Alamaguan I., centre	17 36 0	145 55 0
Pagan I., S.W. point	18 4 0	145 52 0
Agrigan I., S.E. point	18 46 20	145 41 45
Asuncion I., crater	19 45 0	145 30 0
Urracos I., largest islet	20 6 35	145 20 0
Farralon de Pajaros, S. end	20 32 54	144 48 30
Wake I., centre	19 10 54	166 31 30
Gaspar Rico Reef, N. clump of rocks	14 41 0	168 56 15
		Long. W.
Johnston or Cornwallis I., flagstaff on W. island	16 44 48	169 30 6
Clipperton I., centre	10 17 0	109 10 0
Sandwich Islands.		
Hawaii I., Hilo, mouth of Waiaken Creek	19 43 51	155 1 0
Hawaii I., Hilo Bay *	19 45 0	155 5 0
Hawaii I., Kawaihae *	20 1 0	155 43 0
Hawaii I., Keulakeakua Bay, Cook's Monument	19 28 0	155 55 0
Hawaii I., Kailua, stone ch	19 38 26	156 0 15
Kahoolawe I., summit	20 33 39	156 35 21
Maui I., Maku landing-pier	20 38 0	156 22 0
Maui I., Lahaina court-house	20 52 4	156 40 51
Molokai I., E. pt. Halawa stn.	21 9 1	156 43 44
Oahu I., E. pt. Makapun stn.	21 18 16	157 39 20
Oahu I., Diamond Head	21 15 21	157 48 52
Oahu I., Honolulu, Transit of Venus Observatory	21 17 57	157 51 48
Oahu I., Honolulu, King's cot	21 18 14	157 52 0
Kauai I., Hanalei, Charlton's farm	22 14 0	159 27 30
Kauai I., Waimea, stone church	21 57 17	159 40 8
Bird I., centre	23 5 30	161 56 30
Necker I., centre	23 35 18	164 39 0
French Frigate Shoal, islet	23 46 0	166 16 10
Gardiner I., centre	25 0 40	167 59 5
Maro Reef, N.W. point	25 31 0	170 37 33
Laysan I., centre	25 47 47	171 42 30
Lisiansky I., centre	26 0 0	173 57 0
Pearl and Hermes Reef, N.E. extreme	27 56 30	175 46 0
Midway or Brooks Is., S.W. end of Sand I.	28 12 22	177 22 23
Midway or Brooks I., Welles Harbour Anchorage	28 14 0	177 23 15
Ocean I., Sand Islet	28 24 45	178 27 45
		Long. E.
Marcus I., centre	24 14 0	153 58 0
Bonin Is., Parry's Group, N. rock	27 45 0	142 7 0
Bonin Is., Kater I.	27 31 0	142 12 0
Bonin Is., Peel I., Port Lloyd, Observatory	27 5 37	142 11 30
Volcano Is., San Alessandro or North I., centre	25 14 0	141 11 0
Volcano Is., Sulphur I.	24 48 0	141 13 0
Volcano Is., San Augustine I., centre	24 14 0	141 20 0
Rosario I., centre	27 15 32	140 50 28
Douglass Rocks, centre	20 30 0	106 10 0
Borodino Islands, centre of N. island	25 59 38	131 19 30
Borodino Islands, centre of S. island	25 52 45	131 12 17
Rasa I., centre	24 27 0	131 1 50

XV. Islands of the South Pacific.

Places.	Lat. S.	Long. W.
Galapagos Islands.	° ′ ″	° ′ ″
Albemarle I., Iguana Cove	0 59 0	91 28 15
Marlborough I., Cape Hammond	0 31 0	91 36 0
James I., Sugarloaf	0 15 20	90 52 40
Jervis I., summit	0 25 0	90 43 30
Duncan I., centre hill	0 36 30	90 41 0
Indefatigable I., N.W. bay	0 33 25	90 33 45
Barrington I., W. summit	0 50 30	90 10 0
Charles I., summit	1 19 0	90 28 0
Hood I., E. summit	1 25 0	89 39 55
Chatham I., Mount Pitt	0 45 15	89 16 45
Marquesas Islands.		
Fatou Hiva I., S. point	10 30 40	138 43 15
Motane I., S.S.E. point	10 0 40	138 49 30
Taouata I., Port Resolution, watering-place	9 56 0	139 9 0
O-Hiva-Oa I., E. point	9 43 30	138 50 0
Fetou Hougo I., centre	9 25 0	138 57 45
Roa Poua I., Obelisk Islet	9 29 30	140 4 45
Nuka-Hiva I., Port Tai-o-hae	8 54 3	140 6 40
Hiaou or E.-Iao I., S. point	8 3 30	140 44 0
Motu-ili I., summit	8 44 0	140 38 30
Ua-Hu-ka or Ua-Una I., N. point	8 54 0	139 33 30
Fetouhouhou I., N.E. point	7 55 0	140 34 40
Caroline Is., centre	9 54 0	150 8 0
Vostok I., centre	10 5 0	152 23 0
Flint I., centre	11 25 43	151 48 0
Malden I., flag-staff, W. side	4 1 0	154 57 0
Starbuck I., f.-s., W. side	5 38 0	155 55 0
Penrhyn or Tongarewa I., N.N.W. point	8 55 15	158 7 0
Jarvis I., centre	0 22 33	159 54 11
Reirson I., church	10 2 0	161 5 30
Humphrey I., N. point	10 20 30	161 1 12
Union or Tokalau Is., S. point Fakaafo or Bowditch I.	9 26 45	171 8 9
Union or Tokalau Is., Nukonono, or S.E. point Duke of Clarence I.	9 11 15	171 37 2
Union or Tokalau Is., N. point Oatafu or Duke of York I.	8 35 58	172 23 55
Phœnix Islands.		
Canton or Mary I., N. point	2 44 20	171 43 15
Enderby I., centre	3 9 0	171 8 0
Phœnix I., centre	3 47 0	170 44 15
Birney's I., centre	3 34 15	171 33 0
Gardner's I., centre	4 37 42	174 40 18
McKean I., centre	3 35 10	174 17 26
Hull's I., N.W. point	4 29 48	172 20 52
Ellice Islands.		Long. E.
Mukulaelae I., S. point	9 18 0	179 50 0
Funafuti or Ellice I., E. point	8 31 20	179 21 3
Nukufetau or De Peyster's I., S. point	8 4 2	178 28 50
Oaitupu I., S. end	7 32 0	178 46 0
Nui or Lowendahl I.	7 13 20	177 14 30
Nauomaga I., centre	6 12 0	176 16 30
Niutao I., centre	6 8 0	177 22 0
Nauomea I., centre	5 36 30	176 10 0
Ocean or Paanapa I., centre	0 52 2	168 24 25
Pleasant I., centre	0 25 0	167 5 0
Indispensable Reefs, S. point of S. reef	12 50 15	160 26 0
Rennel I., S.E. extreme	11 52 15	160 40 0
Rennel I., W. end	11 33 45	159 55 0

Places.	Lat. S.	Long. E.
Solomon Islands.	° ′ ″	° ′ ″
San Christoval I., Hada or Recherche Bay, S. end of gravel beach	10 15 20	161 15 15
Guadalcana I., Wanderer Bay, mouth of Boyd Creek	9 41 47	159 39 34
Florida I., Mboli Hr., Tree Islet	9 1 30	160 27 20
Malayta I., Village Mary I., Port Adam	9 30 0	161 27 40
Stewart Is., largest islet	8 24 24	163 2 0
Isabel I., N. side of Cockatoo Islet	8 30 50	159 38 20
Kese or Shark I., E. end	8 5 40	156 50 0
Choiseul I., Choiseul Bay ent.	7 0 0	156 25 0
Treasury Is., centre	7 20 30	155 26 0
Bougainville I., N.E. point	5 30 0	155 7 14
Bouki I., summit	5 16 0	154 39 0
Lord Howe Group, centre, small S.W. islet	5 38 0	159 21 0
Lord Howe Group, centre small N.E. islet	5 18 0	159 34 0
Lord Howe Group, N.W. point of Hammond I.	5 18 0	159 17 0
New Britain, Blanche Bay, Matupi I., N.E. point	4 13 20	152 10 18
Duke of York I., Port Hunter, Mitchell Point	4 6 30	152 29 25
New Ireland, Carteret Harbour, Cocoa Nut I.	4 41 26	152 42 25
New Ireland, Katharine Haven	3 11 0	151 35 30
New Ireland, Holz Haven, E. side	2 47 30	150 57 35
New Hanover I., Water Haven, mouth of creek	2 33 43	150 4 33
New Hanover I., North Haven anchorage	2 26 30	149 55 36
St. Matthias I., centre	1 40 0	149 40 0
Admiralty Islands.		
Admiralty I., Nares Harbour, Observatory islet	1 55 10	146 40 56
St. Andrew I., Violet Islet	2 25 40	147 28 35
Jesus Maria I., S.E. point	2 22 0	147 55 0
Commerson I., centre of largest islet	0 44 0	145 18 0
Anchorite I., N. point	0 53 15	145 33 4
Hermit or Loaf I., Pemé Islet	1 28 0	145 8 0
Purdy Is., Mole Islet	2 51 0	146 15 0
New Guinea.		
Point d'Urville, extreme	1 25 40	135 28 12
Drei Cap Peninsula, Wass Islet	2 44 0	132 4 0
Triton Bay, Port au Bus	3 46 0	134 4 0
Cape Walsche, extreme	8 22 0	137 40 0
Fly River, Free Islet S. point	8 41 0	143 37 0
Port Moresby, N. end of Jane Island	9 25 30	147 8 0
Cape Rodney, extreme	10 14 30	148 30 30
South Cape, extreme	10 43 30	150 14 0
Hayter I., W. end	10 37 0	150 41 30
Cape Cretin, Cretin Islets	6 43 0	147 53 20
Louisiade Archipelago.		
Trobriand Is., N.E. pt., Cape Denis	8 24 0	151 1 24
Woodlark Is., Wari-ai Islet	9 10 30	152 53 30
D'Entrecasteaux I., Ferguson I., S.W. extreme	9 38 0	150 30 0
D'Entrecasteaux Is., Well I., E. point	9 41 0	150 58 0

XV. Islands of the South Pacific—*continued.*

Places.	Lat. S.			Long. E.		
Louisiade Archip.—*cont.*	°	′	″	°	′	″
D'Entrecasteaux Is., Normanby I., Observation Islet	9	43	53	150	44	43
St. Aignan I., summit	10	42	0	152	43	0
Renard Is., W. point	10	52	40	152	47	12
Rossel I., E. point	11	23	25	154	8	0
Adèle I., S. extreme	11	29	10	154	26	10
Coral Sea Archipelago.						
Coringa Is., Chilcott Islet	16	50	0	149	58	0
Herald Cays, N.E. Cay	16	55	52	149	12	56
Tregosse Is., S. islet	17	43	0	150	43	0
Lahou Reef, Observation Cay.	17	7	20	152	6	20
Mellish Reef, Cay beacon	17	24	39	155	53	20
Bampton I.	19	8	0	158	36	35
Renard I., centre	19	13	35	158	56	40
Wreck Reef, Bird Islet	22	10	30	155	29	20
Cato I., centre	23	15	2	155	34	0
Santa Cruz Islands.						
Duff or Wilson Group, N. island	9	45	0	167	4	0
Matema or Swallow Group, Nimanu Islet	10	21	0	166	17	0
Tinakula I., summit	10	23	30	165	47	30
Nitendi I., N.E. pt., Cape Byron.	10	40	0	166	0	30
Tapona I., Basilsk Harbour, S. point of entrance	11	17	30	166	32	14
Vanikoro I., Ocili village	11	39	30	166	55	10
New Hebrides Islands.						
Torres I., Hayter Bay, Middle I.	13	15	0	166	33	0
Vanua Lava I., Port Patterson, Nusa Point	13	48	0	167	30	31
Santa Maria I., Lasolara Anch.	14	11	0	167	30	0
Aurora I., Laka-rere	14	58	0	168	2	0
Mallicollo I., Port Sandwich, point on E. side	16	25	30	167	45	0
Vate or Sandwich I., Havannah Harbour, Matapou Bay f.-s.	17	34	49	168	16	5
Erromango I., Dillon Bay, S. point of creek entrance	18	47	30	168	58	0
Tanna I., Port Resolution, Mission	19	31	17	169	27	30
Erronan or Footoona I., N.W. point	19	31	20	170	11	13
Aneitum I., Port Aniteum, Sand Islet	20	15	17	169	44	44
Matthew I., peak	22	20	12	171	20	30
Hunter I., peak	22	24	2	172	5	15
Walpole I., S. point	22	38	7	168	56	45
Mitre I., centre	11	55	0	170	10	0
Rotumah I., Epipigi Peak	12	30	10	177	4	39
Fiji Islands.						
Kandavu I., N. rock, Astralabe Reef	18	37	47	178	31	8
Kandavu I., Mt. Washington, N. peak	19	7	9	177	57	9
Kandavu I., N'galva Harbour, outer beacon	19	5	30	178	12	53
Vatu Lele I., S. point	18	36	0	177	38	0
Ovalau I., Levuka school-house point	17	40	45	178	49	3
Viti Levu I., summit of Malolo Islet	17	44	45	177	9	0
Viti Levu I., Suva Harbour, Na-mbukalon church	18	8	23	178	26	4
Mbega or Mbenga I., highest peak	18	22	1	178	6	26
Matuku I., N. side of Matuku entrance	19	9	38	179	43	23

Places.	Lat. S.			Long. E.		
Fiji Islands—*continued.*	°	′	″	°	′	″
Moala I., rocks off N. point	18	32	49	179	55	21
Ngan I., Herald B., N.W. side.	17	59	32	179	13	4
Wakaya I., Rocky Peak	17	37	11	178	58	25
Makongai I., Dilliendreti Peak.	17	27	14	178	56	42
Goro I., N.W. point	17	16	0	179	17	0
Vanua Levu I., Mbua Bay, Dimba-Dimba Point	16	48	10	178	26	14
Vanua Levu I., Nandi, Obs. Islet	16	57	53	178	46	31
Vanua Levu I., Savu-Savu Pt., extreme	16	49	2	179	16	54
				Long. W.		
Vanua Levu I., N.E. point	16	8	0	179	58	46
Taoiuni I., Somu-Somu town.	16	46	0	179	51	0
Thikombia I., N. hummock	15	47	30	179	55	0
Naitamba I., centre	17	8	0	179	17	0
Vatu Vera I.	17	29	0	179	34	0
Kanathea I., S. point	17	17	20	179	10	0
Vanua Mbalavu I., N.W. point	17	10	0	179	5	45
Mango I., S.E. point	17	29	0	179	10	0
Thithea I., S.E. point	17	48	0	179	19	0
Tabutha I., N.W. peak	17	37	30	178	42	0
Naian I., summit	17	59	0	179	4	0
Lakemba I., Kendal Point	18	14	10	178	52	0
Oneata I., Observation Islet	18	24	25	178	34	35
Mothe I., centre	18	35	10	178	37	0
Mamuka I., centre	18	46	0	178	44	0
Kambara I., S. point	18	56	35	179	0	36
Totoya I., Black Rock Bay, W. side	18	58	57	179	54	2
Fulanga I., W bluff	19	3	0	178	47	25
Ongea Levu I., centre	19	4	0	178	33	25
Vatoa or Turtle I., Hummock	19	49	11	178	14	42
Ono Is., peak	20	39	10	178	44	31
Michaeloff I., centre	21	0	9	178	45	7
Simonoff I., centre	21	1	39	178	50	51
Samoa, &c.						
Foutouna or Horne Is., Mount Schouten	14	14	20	178	7	0
Urea or Wallis I., Fenua-fu Islet	13	23	35	176	11	47
Niua-Fu or Good Hope I., N. W. extreme	15	34	0	175	40	40
Keppel I., centre	15	52	0	173	52	0
Boscawen I., centre	15	58	0	173	52	0
SAMOAN Is., Savaii I., Palu-ale village	13	45	0	172	17	0
Samoan Is., Upolu I., Apia Har., Ruge's Wharf	13	48	56	171	47	34
Samoan Is., Tutuila I., Pago-pago, Observatory point	14	18	6	170	42	31
Samoan Is., Manua I., village N. W. side	14	19	0	169	32	0
Samoan Is., Rose I., centre	14	32	0	168	9	0
Iniue or Sarage I., S. Point	19	10	0	169	50	0
Danger Is. or Bernardo, middle rock	10	52	47	165	51	30
Suwarrow or Souwaroff I., Cocoa Nut Islet	13	14	30	163	4	10
Palmerston Is., W. islet	18	5	50	163	10	0
Scilly Is., E. islet	16	28	0	154	30	0
Bellinghausen I., centre	15	48	0	154	31	0
Mopelia (Lord Howe) I., centre	16	52	0	154	0	0
Society Islands.						
Maitea I., summit	17	53	0	148	5	0
Tahiti I., Papiete Harb., Motuuta I.	17	31	39	149	34	21
Tubuai-Manu or Maia-Iti I., N.	17	38	41	150	35	51

XV. Islands of the South Pacific—*continued.*

Places.	Lat. S.	Long. W.
Society Islands—*continued.*	° ′ ″	° ′ ″
Eimeo I., Talu Harbour anch..	17 28 30	150 49 30
Huaheine I., Owaharre Har. bar	16 42 49	151 7 36
Ulietea I., Regent Point.....	16 50 0	151 27 21
Tahoa I., centre.....	16 35 0	151 35 0
Bola-Bola I., Otea-Vanua Vill.	16 31 35	151 46 0
Tubai or Motu-iti I., N. point of reef.....	16 11 0	151 48 0
Marua or Maupili I., centre....	16 26 0	152 12 0
Paumotu or Low Archip.		
Ducie I., N. E. entrance.....	24 40 20	124 48 0
Pitcairn I., Village.....	25 3 37	130 8 23
Henderson I., centre.....	24 21 20	128 19 0
Oeno I., N. point.....	24 1 20	130 41 0
Timoe or Crescent I., N.W. pt.	23 19 0	134 28 48
Mauga-reva or Gambier's I., flag-staff.....	23 7 36	134 57 47
Marutea I., centre.....	21 30 50	135 33 19
Maria I., centre.....	21 58 30	136 20 46
Matureivavao I., N. point.....	21 25 0	136 24 46
Vohanga I., W. point.....	21 18 0	136 38 53
Tenaranga I.....	21 18 30	136 32 20
Tenavaro I., W. point.....	21 18 0	136 45 46
Morane I., centre.....	23 7 5	137 8 52
Tareia I., E. point.....	20 44 53	138 20 53
Mururea I., entrance.....	21 50 0	138 55 49
Ahunui I., N. E. point.....	22 12 25	138 41 48
Tematongi I., N. point.....	21 37 41	140 40 0
Mukutipipi I., S.W. point.....	20 42 8	143 5 57
Anu Aruaro I., W. point.....	20 25 17	143 33 58
Hereheretua I., W. point.....	19 53 17	145 7 0
Vana Vana I., W. point.....	20 46 7	139 5 34
Vairaatea I., W. point of reef.	19 20 0	139 15 55
Nukutuvake or Whitsunday I., N.W. point.....	19 23 38	138 41 46
Pukaruha or Clermont Tonnerre I., centre.....	18 33 42	136 20 0
Reao I., N.W. point.....	18 16 0	137 4 15
Vahitahi I., W. point.....	18 43 19	138 52 46
Pinaki I., N.W. point.....	19 40 22	140 24 23
Aki-Aki I., centre.....	18 30 8	139 13 46
Nukutapipi I., E. point.....	19 17 40	138 48 16
Tatakoto I.....	17 19 0	138 21 7
Amanu I., S. W. point.....	17 53 20	140 50 26
Hao or Bow I., N.W. pass.....	18 5 45	140 59 7
Paroa I.....	19 8 44	141 42 46
Manuwangi I., centre.....	19 10 19	141 12 47
Nengo-nengo I., S.W. point...	18 45 53	141 46 39
Ravahere I., S. point.....	18 18 30	142 11 31
Marokan Islets, S.S.E. pass....	18 5 1	142 13 2
Tekokota I., W. part.....	17 20 16	142 36 20
Reitora or Bird I., N. beach...	17 49 35	143 5 23
Hikeruo I., E. point.....	17 35 28	142 35 16
Tauere I., N.W. point.....	17 20 30	141 29 43
Puka-puka I., E. point.....	14 56 0	138 42 3
Napuka I., W. point.....	14 12 0	141 15 37
Angatan I., W. point.....	15 50 0	140 53 31
Takume I., N.W. point.....	15 44 20	142 8 40
Tuanske I., N.W. point.....	16 38 42	144 14 45
Hiti I., N.W. point.....	16 42 14	144 8 20
Nihiru I., S.W. point.....	16 44 30	142 53 34
Marutea I., W. point.....	16 54 46	143 19 3
Tahanea I., N.W. point.....	16 46 46	144 58 0
Anaa I., Islet in N. pass.....	17 20 20	145 30 54
Tepoto I., N. point.....	16 47 49	144 17 18
Haraiki I., S.W. point.....	17 28 42	148 31 17
Motu-tunga I., N. pass.....	17 2 16	144 22 48
Makuimu I., W. pass.....	16 26 9	143 57 59
Katiu I., S.W. pass.....	16 22 37	144 27 31
Faaite I., W. extreme.....	16 41 32	145 22 13

Places.	Lat. S.	Long. W.
Paumotu or Low Archipelago—*continued.*	° ′ ″	° ′ ″
Fakarawa I., S.E. pass.....	16 30 55	145 22 23
Raraka I., N.W. pass.....	16 4 59	144 57 19
Taiero I., middle of W. shore..	15 43 15	144 38 34
Aratika I., E. point.....	15 27 40	145 16 16
Kavahi I., S.W. pass.....	15 55 5	145 9 16
Toau I., N. pass.....	15 51 0	146 3 16
Niau I., N.W. point.....	16 8 0	146 24 11
Raukura I., N.W. pass.....	15 38 47	146 48 11
Arutua I., E. pass.....	15 18 0	146 40 11
Tikei I., centre.....	14 57 0	144 42 16
Tokapoto I., S. point.....	14 44 10	145 13 16
Manhii I., E. side of entrance..	14 27 46	146 4 42
Ahii I., S.W. point.....	14 34 40	146 25 11
Rairoa or Vliegen I., S.E. pt...	15 18 7	147 15 33
Makatea I., W. point.....	15 50 30	148 16 46
Matahiva I., W. point.....	14 53 0	148 43 36
Juan Fernandez I., fort S. Juan Baptista.....	33 37 36	78 49 45
Mas-a-fuera I., summit.....	33 46 0	80 46 0
St. Ambrose I., summit.....	26 21 0	79 40 30
St. Felix I., centre.....	26 16 0	80 6 56
Sala y Gomez, N.W. point.....	26 27 41	105 28 0
Easter I., Cook's Bay, mission.	27 10 0	109 26 0
Rapa or Oparo I., Tauna Islet.	27 35 46	144 17 21
Bass Islets (Morotiri), S.E islet	27 55 30	143 28 21
AUSTRAL Is., Vivitoa I., centre.....	23 55 0	147 48 0
Toubai I., flag-staff, N. side....	23 21 45	149 35 35
Rurutú I., N. point.....	22 29 0	151 23 41
Rimitara I., centre.....	22 45 0	152 55 0
Cook Islands.		
Hull I., N.W. point.....	21 47 0	154 51 0
Mangara I., centre.....	21 49 0	157 56 0
Rarotonga I., N.W. point.....	21 11 35	159 47 0
Mauki or Parry I., centre.....	20 17 0	157 23 0
Mitiero I., centre.....	20 1 0	157 34 0
Vatiu or Atiu I., centre.....	20 4 0	158 8 0
Hervey Islets, centre.....	19 18 0	158 54 0
Aitutaki I., centre.....	18 54 0	159 32 0
Loyalty and Friendly Islands.		
FRIENDLY Is., Vavao I., Port Valdes, Sandy Point...	18 39 2	174 1 0
Kao I., summit.....	19 41 35	174 59 50
Tofua I., summit.....	19 45 0	175 3 0
Tongatabu I., Nakalofa, King's garden.....	21 8 20	175 8 7
Minerva Reefs, N. Minerva, N.E. side.....	23 37 19	178 49 39
Minerva Reefs, S. Minerva, S. side of entrance	23 56 22	179 4 57
KERMADEC Is., Raoul Is., Denham Bay flag-staff.....	29 15 30	177 54 52
Macauley I., centre.....	30 16 0	178 32 0
Curtis I., centre.....	30 36 0	178 37 0
		Long. E.
Conway Reef, centre.....	21 45 0	174 37 0
LOYALTY Is., Uea Island, Bishop Sound, Oidiy Islet...	20 28 0	166 28 0
Lifou I., Wreck Bay, N.W. sho.	20 46 0	167 2 30
Britannia I., S. point.....	21 42 0	168 0 0
New Caledonia.		
Port Kanala, Observatory.....	21 29 12	165 58 50
Port St. Vincent, Marceau I....	22 0 10	166 5 0

XV. Islands of the South Pacific—*continued.*

Places.	Lat. S.	Long. E.
New Caledonia—*continued.*	° ′ ″	° ′ ″
Noumea *	22 16 20	166 27 8
Balari Pass, Amedée I.*,	22 28 44	166 28 50
Port Alcmene, Alcmene I.	22 42 30	167 27 55
NORFOLK I., lower flag-staff at jetty	29 3 45	167 58 6
Elizabeth Reef, centre	29 56 0	159 4 30
Lord Howe I., S. end of middle beach	31 31 38	159 5 58
Ball's Pyramid, summit	31 45 10	159 16 10
Macquarie I., N. point	54 19 0	158 56 0
Auckland Is., Port Ross, Terror Cove	50 32 30	166 12 34
Campbell I., S. harbour, Shoal Point	52 33 26	169 8 41
Antipodes I., summit	49 42 0	178 43 5
Bounty Is., E. islet	47 46 0	178 56 44
		Long. W.
Chatham I., Whare-Kauri I., Port Waitangi, Pt. Hanson.	43 57 24	176 32 15
Chatham I., Whare-Kauri I., Port Hutt, Gordon Point	43 49 0	176 39 50

XVI. Australia, Tasmania, and New Zealand.

Australia.	Lat. S.	Long. E.
CAPE YORK, Sextant Rock.	10 41 30	142 33 20
Mount Adolphus, summit	10 37 45	142 39 20
Travers Isles, centre	10 22 0	142 22 15
Prince of Wales I., Cape Cornwall, extreme	10 46 0	142 10 50
BOOBY I., centre	10 36 5	141 54 45
Flinders River, entrance	17 36 40	140 37 6
Albert River, Kangaroo Point.	17 35 10	139 45 56
Sweers I., Inscription Point	17 6 50	139 38 36
Groate Eylandt, S.E. point	14 16 0	136 58 0
Bickerton I., summit	13 45 0	136 15 0
Cape Arnheim, extreme	12 14 0	137 0 0
Cape Wilberforce, E. extreme.	11 53 0	136 34 0
Cape Wessel, extreme	10 59 0	136 45 0
Dale Point, extreme	11 36 0	136 7 0
Cape Stewart, extreme	11 57 0	134 46 0
Liverpool River, Haul Round Islet	11 54 0	134 12 0
Cape Croker, extreme	10 58 0	132 37 30
PORT ESSINGTON, Smith Point	11 7 23	132 10 37
Melville I., Cape Van Diemen.	11 8 0	130 20 0
Bathurst I., Cape Fourcroy	11 51 0	129 57 0
Adelaide River, E. entrance pt.	12 13 20	131 16 30
PORT DARWIN, Emery Pt.	12 27 45	130 50 45
Port Patterson, Quail Islet	12 30 53	130 28 50
Port Keats, Tree Point	13 59 0	129 37 0
Pearce Point, extreme	14 25 50	129 21 11
Victoria River, Water Valley.	15 13 45	129 48 14
Cape Dussejour, rock off cape.	14 42 0	128 11 0
Cape Londonderry, extreme	13 44 0	126 57 0
Cape Bougainville, extreme	13 52 0	126 12 0
Cassini I., centre	13 55 0	124 45 0
Cape Voltaire, Flat Hill	14 15 0	125 43 0
Barker Islets, centre	13 55 0	124 55 0
MONTALIVET Is., W. islet.	14 14 0	125 12 0
Maret Islets, N. islet	14 23 0	125 0 0
Colbert Islet, centre	14 51 0	124 46 0
Prince Regent River, Mount Trafalgar	15 16 36	125 7 0
Port Nelson, Careening Beach.	15 6 0	125 4 0
De Freycinet Islets, W. islet.	15 0 0	124 36 0
Red Islet, centre	15 13 15	124 16 0
Cockell Islet, W. point	15 46 0	124 4 0
MacLeay Islets, rock off N. end	15 52 0	123 45 0
Port Usborne, S. point	15 39 25	123 36 27
Fitz Roy River, Escape Point.	17 24 25	123 39 47
Cape L'Evêque, extreme	16 23 0	123 1 0
LACEPEDE I., N.W. islet	16 50 0	122 10 0
Cape Baskerville, extreme	17 9 0	122 19 0
Cape Latouche Tréville, extr.	18 29 0	121 54 0
Turtle Isles, centre of N. isle.	19 53 45	118 54 28
Cape Lambert, extreme	20 36 0	117 11 0
Legendre I., N.W. extreme	20 19 0	116 46 0
Rosemary I., W. summit	20 27 0	116 30 0
Enderby I., Rocky Head	20 35 0	116 23 0
Montebello I., N. extr. of reef.	20 20 0	115 32 0
Barrow I., N. point	20 40 40	115 27 45
NORTH WEST CAPE, extr.	21 47 40	114 2 15
Cape Cuvier, extreme	24 0 0	113 22 0
Cape Inscription, extreme	25 29 19	112 57 9
Houtman Rocks, N. islet	28 18 5	113 36 33
Port Gregory	28 12 0	114 14 30
Cape Leschenault, extreme	31 18 0	115 30 0
Rottenest I.*	32 0 20	115 31 12
PERTH, Arthur Head *	32 3 12	115 45 3
Peel, Robert Point	32 27 0	115 44 0
Cape Naturaliste, extreme	33 32 0	114 55 0
CAPE LEUWIN, summit	34 19 0	115 6 0
D'Entrecasteaux Point, extr.	34 52 0	116 1 0
Nuyts Point, extreme	35 5 0	116 38 0
West Cape Howe, extreme	35 9 0	117 40 0
Eclipse Islets, summit of largest	35 11 54	117 53 45
KING GEORGE SOUND, Commissariat house near Albany jetty	35 2 20	117 54 0
Bald Isle, centre	34 55 0	118 27 0
Hood Point, Doubtful Isles	34 24 0	119 34 0
Recherche Archipelago, Termination Isle	34 30 0	121 58 0
Culver Point, extreme	32 57 0	124 39 0
Dover Point, extreme	32 34 0	125 30 0
Fowler Point, extreme	32 1 30	132 33 0
Streaker Bay, Port Blanche	32 48 0	134 13 40
Coffin Bay, Mount Dutton	34 29 29	135 24 56
CAPE CATASTROPHE, W. point	35 0 30	135 56 30
Neptune Isles, S.E. islet	35 20 30	136 7 0
Port Lincoln, English church.	34 43 22	135 51 24
Franklin Harbour, obs. spot	33 44 8	136 57 22
Port Augusta, flag-staff	32 29 42	137 45 45
Port Victoria, Wardang I. hut.	34 28 25	137 22 22
Cape Spencer, S. point	35 18 21	136 53 30
Investigator Strait, Troubridge *	35 7 31	137 49 39
Port Wakefield, Inner end of Clinton jetty	34 13 59	138 1 37
PORT ADELAIDE, Snapper Point	34 46 50	138 31 0
Cape Jervis *	35 36 45	138 5 50
Cape Borda *	35 45 30	136 35 0
Cape Willoughby *	35 51 0	138 7 45
Port Victor, flag-staff	35 34 6	138 37 30
Cape Jaffa, extreme	36 57 30	139 40 30
Cape Northumberland *	38 4 18	140 40 1
Cape Nelson, S. extreme	38 26 0	141 33 0
Portland Bay, Laurence Rock.	38 24 39	141 40 23
Port Fairy, Griffith I., summit	38 23 47	142 14 58
Cape Otway *	38 51 45	143 31 0
King I., Cape Wickham *	39 35 35	143 57 0

XVI. Australia, Tasmania, and New Zealand—*continued.*

Places.	Lat. S.			Long. E.		
	°	′	″	°	′	″
Australia—continued.						
PORT PHILIP, Pt. Lonsdale*	38	17	40	144	36	58
Geelong, custom-house	38	8	52	144	21	47
MELBOURNE, Observatory	37	49	53	144	58	42
Cape Schanck*	38	29	42	144	53	2
Port Western, extreme of W. head	38	29	15	145	1	55
Wilson Promontory, S.E. pt.*	39	8	0	146	25	37
Kent I., Deal I.*	39	29	45	147	19	0
Flinders I., Strzelecki Peaks, S.E. peak	40	11	45	148	4	0
Goose I.*	40	18	5	147	47	20
Banks Strait, Swan I.*	40	43	20	148	6	30
Port Albert*	38	45	6	146	37	43
Gabo I.*	37	34	15	149	55	10
CAPE HOWE, east extreme	37	30	10	149	59	35
Cape Green, S.E. point	37	15	40	150	4	0
Twofold Bay, Lookout Point*	37	4	18	149	55	41
Dromedary Mountain, summit	36	18	30	150	2	30
Montagu I., S. point	36	15	40	150	14	40
Bateman Bay, Obs. head	35	43	58	150	13	30
Ulladulla, inner end of pier	35	21	41	150	30	25
Jervis Bay*	35	9	15	150	47	22
Kiama Harbour, outer extreme of S. head	34	40	25	150	53	15
Wollongong, summit of head	34	25	30	150	56	10
SYDNEY, Observatory	33	51	41	151	12	39
Port Jackson, outer S. head*	33	51	30	151	18	15
Broken Bay, Baranjo Head	33	35	0	151	20	30
NEWCASTLE, Nobby Head*	32	55	15	151	49	15
Port Stephen, Point Stephen's*	32	45	10	152	13	20
Sugar Loaf Point*	32	26	10	152	33	20
Port Macquarie, entrance	31	25	30	152	56	15
Solitary Is., S. isle*	30	12	0	153	17	0
Clarence River, S. head*	29	25	30	153	23	10
Richmond River, N. head*	28	51	30	153	35	45
Lookout Point, extreme	27	26	20	153	33	50
CAPE MORETON*	27	2	10	153	29	0
Double Island Point, E. extr.	25	55	50	153	12	50
Indian Head, extreme	25	0	15	153	23	0
Sandy Cape*	24	43	20	153	13	40
Burnett River, S. head	24	45	0	152	25	20
Lady Elliot Islet, centre	24	7	0	152	45	30
Bustard Head*	24	1	20	151	42	0
Rodd Bay, Spit end	24	1	20	151	37	15
Port Curtis, Gatcombe Head	23	52	50	151	23	40
CAPE CAPRICORN*	23	29	30	151	15	0
Port Bowen, Observation Rock	22	31	40	150	46	40
Percy Isles, Pine Peak	21	31	30	150	8	45
Northumberland Isles, summit of Prudhoe I	21	19	15	149	43	30
Cape Palmerston, N. extreme	21	32	0	149	32	0
Cape Conway, S.E. point	20	32	20	148	58	0
Port Molle, S. side of entrance	20	18	50	148	53	15
Cumberland I., Whitsunday I., summit on W. side	20	15	30	149	0	0
Port Denison, Obs. point, W. side of Stone Isle	20	0	50	148	17	50
Gloucester I., sum. near N. end	19	57	30	148	28	30
Holborne Islet, centre	19	41	50	148	23	0
CAPE BOWLING GREEN*	19	19	20	147	27	40
Cape Cleveland, N.W. extr.	19	11	15	147	1	10
Palm Is., S.E. pt. of S.E. island	18	45	30	146	42	50
Rockingham Bay, peak of Goold Isle	18	9	30	146	12	0
Barnard I., outer N. isle	17	40	30	146	12	30
Frankland I., high islet	17	9	45	146	2	30
Cape Tribulation, extreme	16	4	20	145	30	30
Hope I., S. islet	15	45	0	145	28	30
Cook Mountain, summit	15	29	45	145	17	30
Cape Bedford, S.E. extreme	15	16	30	145	23	15

Places.	Lat. S.			Long. E.		
	°	′	″	°	′	″
Australia—continued.						
Murdock Point, extreme	14	37	15	144	57	30
CAPE MELVILLE, N. E. extreme	14	10	0	144	33	30
Flinders I., N. extr. of N. island	14	7	45	144	16	15
Claremont Point, extreme	14	0	30	143	42	15
Cape Sidmouth, extreme	13	24	45	143	37	15
Cape Direction, N.E. extreme	12	51	0	143	34	0
Cape Grenville, extreme	11	58	15	143	15	15
Sir Charles Hardy I., N. extr. of S.E. isle	11	55	0	143	29	0
Bird I., N.W. isle	11	46	30	143	6	0
Hannibal Isles, E. isle	11	36	30	142	57	15
Tasmania.						
CAPE PORTLAND, N.W. pt.	40	44	0	147	55	40
Port Dalrymple, low head*	41	3	25	146	48	15
Port Sorrell, N.W. entr. head	41	7	5	146	33	30
Port Frederick, entrance	41	10	0	146	24	30
Leven River, W. entr. head	41	8	30	146	12	0
Emu Bay, Blackman Point	41	2	50	145	57	0
Hunter I., N. point	40	23	40	144	47	45
Cape Grim, outer Doughboy Islet	40	40	10	144	40	40
Albatross Islet, N. point	40	22	0	144	39	40
Arthur River, entrance	41	4	0	144	44	0
Pieman River, rocks close to entrance	41	41	0	144	57	0
MACQUARIE HARBOUR, entrance islet	42	11	37	145	13	30
Cape Sorrell, N.W. extreme	42	11	30	145	10	0
Port Davey, Pollard on N. hd.	43	19	0	145	53	0
South West Cape, extreme pt.	43	33	30	146	2	0
Mewstone Rock, centre	43	44	30	146	23	0
Cape Bruny*	43	29	40	147	9	45
Bruny I., Penguin Islet	43	21	0	147	23	40
HOBART TOWN, Transit of Venus station	42	53	25	147	20	7
Hobart Town, Fort Mulgrave	42	53	32	147	21	13
Cape Pillar, Tasman Islet	43	14	0	148	2	0
Cape Frederick Hendrik, extr.	42	52	0	148	0	0
Freycinet Peninsula, summit	42	13	0	148	19	0
St. Patrick Head, N. point	41	34	0	148	19	30
Eddystone Point, extreme	40	59	0	148	20	0
New Zealand.						
THREE KINGS Is., N.E. extreme of N.E. island	34	7	20	172	9	45
NORTH CAPE, Cape Islet	34	28	30	173	4	30
Parenga-renga Harbour, Kohan Point	34	31	0	173	1	50
Monganui Harb., White's Pt.	35	0	20	173	33	35
Wangaroa Harb., Peach Islet	35	1	44	173	46	44
Bay of Is., Motu Mea Islet	35	17	0	174	7	2
Wangaruru Harbour, Grove Pt.	35	23	48	174	22	20
Wangari Harbour, Loot Point	35	51	9	174	32	10
Great Barrier I., Aiguilles Pt.	36	1	15	175	26	30
AUCKLAND HARBOUR, Depôt Point	36	50	5	174	49	10
Coromandel Harb., Tuhnia I.	36	48	35	175	25	30
Cape Colville, N. point	36	28	20	175	22	0
Cuvier I., highest peak	36	26	20	175	48	20
Tauranga Harbour, Mount Monganui	37	36	25	176	11	10
White I., summit	37	30	0	177	11	45
Cape Runaway, extreme	37	30	45	178	0	30
East Cape, islet	37	40	0	178	36	5
Tolaga Bay, Matu-heka Islet	38	20	50	178	21	10
Mahia Peninsula, S. extreme of Portland I	39	17	40	177	53	5
Ahurivi Harbour, Maori Pah.	39	28	44	176	55	10

XVI. Australia, Tasmania, and New Zealand—*continued.*

Places.	Lat. S.	Long. E.
New Zealand—*continued.*	° ′ ″	° ′ ″
Kidnapper's Cape, extreme	39 38 0	177 7 40
Cape Palliser, extreme	41 36 50	175 17 0
PORT NICHOLSON, Pencarrow *	41 21 40	174 52 0
Mana-watu River *	40 27 10	175 14 40
Wanganui River, N. head	39 57 20	175 1 0
Egmont Mountain, summit	39 18 0	174 4 55
New Plymouth, flag-staff	39 3 35	174 5 31
Kawhia Harbour, S. head	38 4 50	174 49 0
Aotea Harbour, S. head	37 59 35	174 51 0
Whaingaroa Harbour, S. entr. point	37 46 22	174 53 15
MANUKAU HARBOUR, Paratutai flag-staff	37 8 0	174 32 10
Kaipara Harbour, S. head	36 25 10	174 14 33
Hokianga River, f.-s. at entr.	35 32 5	173 22 55
Cape Campbell *	41 43 15	174 18 30
Port Cooper, Lyttleton custom-house	43 46 42	172 44 17
Akaroa I. *	43 54 0	173 0 20
Ashburton River, N. entr. pt.	44 4 50	171 49 30
Waitangi River, N. entr. head	44 54 50	171 12 10
OTAGO HARBOUR, Tairoa Head *	45 47 0	170 45 0
Molyneux Bay, landing-place	46 24 5	169 48 49
Nugget Point *	46 27 15	169 51 30
Bluff Harbour, point near anch.	46 36 17	168 21 55
Tewalwae Bay, Pahia Point	46 20 40	167 43 15
Solander Is., summit	46 36 0	166 55 0
Preservation Inlet, Cuttle Cove	46 4 30	166 40 38
West Cape, extreme	45 54 20	166 26 30
Queenstown, U.S. Tr. of Venus station	45 2 7	168 40 6
Milford Sound, Freshwater Basin	44 40 20	167 55 41
Cascade Point, N. extreme	44 0 30	168 22 30
Grey River, N. shore *	42 30 0	171 11 0
HOKITIKA, entrance	42 42 20	170 59 30
Cape Foulwind, extreme	41 45 30	171 34 30
Cape Farewell, extreme	40 29 50	172 42 10
Nelson, Boulder Bank *	41 15 5	173 17 7
D'Urville I., Port Hardy	40 46 35	173 55 0
Port Gore, Head of Melville Cove	41 1 55	174 12 18
WELLINGTON, Observatory	41 16 57	174 47 10
Port Underwood, Flag-Point	41 20 28	174 9 20
Port William, Howell's House	46 50 30	168 6 30
Paterson's Inlet, Glory Cove	46 58 30	168 10 50
Port Adventure, White Beach, S. end	47 3 52	168 11 53
Port Pegasus, Cove abreast Anchorage I.	47 11 40	167 41 47
Codfish I., N.W. extreme	46 45 45	167 37 45
Snares Is., S.W. islet	48 6 43	166 28 40

XVII. The Arctic Regions, Greenland and Iceland.

	Lat. N.	Long. W.
CAPE WALSINGHAM, extreme	66 0 0	69 28 0
Magnetic Pole, 1831	70 5 0	96 47 0
Alert's Winter Quarters	82 27 0	61 18 0
Alert's farthest	83 20 26	...
Cape Columbia, extreme	83 7 0	70 20 0
Melville I., Winter Harbour	74 47 10	110 48 15
		Long. E.
Novaya Zembla, Vaigat's I., N. point	70 25 0	59 10 0
Franz Josef Land, Wilczek I.	79 55 0	58 45 0
Archangel, Trinity Church	64 32 6	40 33 30
SPITZBERGEN I., S. cape	76 35 0	17 23 0

Greenland and Iceland.	Lat. N.	Long. W.
Upernavik, flag-staff	72 47 48	55 53 42
Holsteinberg, village	66 55 54	53 40 18
Julianshaab, village	60 43 7	46 1 0
CAPE FAREWELL, Staten Huk	59 49 0	44 1 42
Cape Bismark, extreme	76 47 0	18 40 0
Jan Mayen I., Mount Beerenberg	71 4 0	7 36 0
Jan Mayen I., Young's Foreland, or C. Northeast	71 8 0	7 26 0
REYKIAVIK, Observatory	64 8 40	21 55 0

DISTANCE TABLE.

(TABLE 51.)

Atlantic Ocean.

	Distance traversed by Vessels with Auxiliary Steam-power.	Distance traversed by Full-powered Steam Vessels.
From Plymouth *to*	Miles.	Miles.
Ascension	4,276	3,890
Bahia	4,450	4,190
Barbados	4,030	3,500
Bermuda	—	2,810
„ (southern route)	3,870	—
Bordeaux	420	420
Cape Horn	7,120	7,120
Cape of Good Hope	6,400	6,000
Demerara	4,100	3,730
Dover	225	225
Gibraltar	1,050	1,050
Halifax (northern route)	2,450	2,400
„ (southern route)	4,460	—
Havana	—	3,870
Lisbon	770	770
Madeira	1,210	1,210
Magellan Strait, E. entrance	7,250	6,980
New Orleans	6,140	4,450
New York	—	2,940
„ (southern route)	4,560	—
Quebec	2,700	2,620
Rio Janeiro	5,130	4,900
St. Thomas	3,800	3,500
St. Vincent (C. Verde Islands)	2,260	2,260
Sierra Leone	2,740	2,700
Tenerife	1,430	1,430
From London *to*		
Antwerp	190	190
Christiania	650	650
Copenhagen	690	690
Hamburg	420	420
Leith	430	430
St. Petersburg	1,460	1,460
Stockholm	1,180	1,180
From Liverpool *to*		
Bilbao	700	700
Bordeaux	670	670
Gibraltar	1,260	1,260
Lisbon	990	990
New York	3,070	3,070
From Gibraltar *to*		
Barbados	3,480	3,210
Bermuda	3,270	2,880
Brindisi	1,330	1,330
Constantinople	1,820	1,820
Genoa	860	860
Halifax	3,860	2,640
Madeira	610	610
Malta	980	980
Marseille	690	690
Naples	960	960
Plymouth	1,200	1,050
Port Said	1,920	1,920
St. Vincent (C. Verde Islands)	1,560	1,560
From Halifax *to*		
Bermuda	730	730

	Distance traversed by Vessels with Auxiliary Steam-power.	Distance traversed by Full-powered Steam Vessels.
From Halifax *to*	Miles.	Miles.
Gibraltar	2,680	2,640
Havana	—	1,650
New York	480	480
Plymouth	2,480	2,400
Quebec	750	750
St. John's (Newfoundland)	530	530
From Bermuda *to*		
Ascension	—	3,770
Barbados	1,270	1,160
Cape of Good Hope	—	6,120
Demerara	1,620	1,550
Gibraltar	3,060	2,880
Havana	1,250	1,150
„ (Old Bahama channel)	1,400	—
New York	690	690
Plymouth (northern route)	2,810	2,810
„ (southern route)	2,970	—
Port Royal (Jamaica)	1,140	1,140
St. Thomas	840	840
From St. Vincent (Cape Verde Islands) *to*		
Ascension	2,480	1,640
Cape of Good Hope	4,560	3,930
Plymouth	2,820	2,250
Rio Janeiro	2,870	2,690
St. Helena	4,200	2,270
Sierra Leone	900	850
From Port Royal (Jamaica) *to*		
Barbados	1,070	1,010
Bermuda	1,140	1,140
„ (leeward passage)	1,900	—
Colon	560	560
Plymouth	4,110	3,950
Vera Cruz	1,200	1,200
From St. Thomas *to*		
Barbados	550	450
Colon	1,080	1,020
From Barbados *to*		
Bermuda	1,160	1,160
Plymouth	4,100	3,500
Port Royal (Jamaica)	1,010	1,010
Sierra Leone	—	2,720
From Sierra Leone *to*		
Ascension	1,530	1,000
Cape of Good Hope	3,660	3,120
Cape Coast	900	900
Demerara	—	2,670
Fernando Po	1,500	1,530
Plymouth	3,720	2,700
From Cape Coast *to*		
Fernando Po	600	600
Plymouth	5,700	3,600
From Fernando Po *to*		
St. Helena	1,560	1,480
Sierra Leone	1,820	1,500

ATLANTIC OCEAN—*continued.*

	Distance traversed by Vessels with Auxiliary Steam-power.	Distance traversed by Full-powered Steam Vessels.
From ASCENSION *to*	Miles.	Miles.
Cape of Good Hope	3,140	2,380
Plymouth	4,650	3,890
Rio Janeiro	1,900	1,900
St. Helena	1,620	680
St. Vincent (C. Verde Islands)	1,650	1,640
Sierra Leone	1,000	1,000
From ST. HELENA *to*		
Ascension	680	680
Cape Coast	1,290	1,290
Cape of Good Hope	2,720	1,700
Congo River	1,230	1,230
Plymouth	5,330	4,210
Rio Janeiro	2,130	2,110
From BAHIA *to*		
Pernambuco	370	370
Plymouth	5,000	4,190
Rio	710	710
From RIO JANEIRO *to*		
Ascension	2,280	1,900
Bahia	710	710
Cape Horn	2,350	2,350
Cape of Good Hope	3,540	3,240
Monte Video	980	980
Pernambuco	1,090	1,090
Plymouth	—	4,900
„ (Nov.–Feb.)	6,300	—
„ (Feb.–Nov.)	5,680	—
Port Stanley (Falkland Islands)	1,860	1,860
St. Helena	2,760	2,110

	Distance traversed by Vessels with Auxiliary Steam-power.	Distance traversed by Full-powered Steam Vessels.
From RIO JANEIRO *to*	Miles.	Miles.
St. Vincent	—	2,690
From MONTE VIDEO *to*		
Cape Horn	1,370	1,370
Cape of Good Hope	3,620	3,550
Magellan Strait (E. entrance)	1,170	1,170
Plymouth	—	5,900
„ (Oct.–Apr.)	7,020	—
„ (Apr.–Oct.)	6,630	—
Port Stanley (Falkland Islands)	1,100	1,000
From CAPE OF GOOD HOPE *to*		
Ascension	2,380	2,380
Bermuda	6,160	6,120
Cape Virgins	—	3,950
Congo River	1,800	1,800
New York	6,850	6,800
Plymouth	7,030	6,000
Rio Janeiro	3,570	3,240
St. Helena	1,700	1,700
St. Vincent (C. Verde Islands)	3,930	3,930
Sierra Leone	3,120	3,120
From CAPE HORN *to*		
Plymouth	8,300	7,120
Port Stanley (Falkland Islands)	480	480
St. Helena	3,720	3,550
From MAGELLAN STRAIT (E. entrance) *to*		
Cape of Good Hope	4,080	3,950
Monte Video	1,170	1,170
Port Stanley	440	440

INDIAN OCEAN.

From SUEZ *to*		
Aden	1,310	1,310
Jidda	640	640
Port Said	87	87
Suakim	740	740
From ADEN *to*		
Adelaide	—	6,000
Batavia	3,750	3,750
Bombay	1,640	1,640
C. of Good Hope: (N.E. monsoon)	4,100	4,100
(S.W. monsoon)	5,950	4,360
Colombo	—	2,130
„ (N.E. monsoon)	4,000	—
„ (S.W. monsoon)	2,135	—
King George Sound	—	4,960
Madras (S.W. monsoon)	2,710	2,710
Mauritius (N.E. monsoon)	2,500	2,340
„ (S.W. monsoon)	3,610	2,680
Melbourne	—	6,310
Natal (N.E. monsoon)	3,350	3,350
„ (S.W. monsoon)	5,100	3,600
Seychelle Is. (N.E. monsoon)	1,420	1,420
(S.W. monsoon)	3,130	1,420
Zanzibar (N.E. monsoon)	1,720	1,720
„ (S.W. monsoon)	4,120	1,720
From BOMBAY *to*		
Aden (N.E. monsoon)	1,640	1,640
„ (S.W. monsoon)	2,340	1,640
Calcutta	—	2,120
„ (N.E. monsoon)	2,660	—
„ (S.W. monsoon)	2,100	—
C. of Good Hope (N.E. monsoon)	4,650	4,650
(S.W. monsoon)	5,820	4,960
Karachi	540	500

From BOMBAY *to*		
Madras	1,480	1,480
Maskat	880	880
Mauritius (N.E. monsoon)	2,540	2,540
„ (S.W. monsoon)	3,480	2,960
Point de Galle	960	960
Seychelle Is. (N.E. monsoon)	1,760	1,760
(S.W. monsoon)	3,120	2,000
Singapore	2,460	2,460
Zanzibar (N.E. monsoon)	2,530	2,530
„ (S.W. monsoon)	2,700	—
From COLOMBO *to*		
Aden (N.E. monsoon)	2,130	2,130
„ (S.W. monsoon)	3,550	2,130
Calcutta	—	1,220
„ (N.E. monsoon)	1,700	—
„ (S.W. monsoon)	1,220	—
Cape of Good Hope:		
(N.E. monsoon)	4,440	4,310
(S.W. monsoon	4,860	4,600
King George Sound	—	3,380
Madras	—	580
„ (N.E. monsoon)	1,200	—
„ (S.W. monsoon)	580	—
Mauritius (N.E. monsoon)	2,090	2,090
„ (S.W. monsoon)	2,500	2,400
Melbourne	—	4,730
„ (N.E. monsoon)	6,300	—
„ (S.W. monsoon)	6,600	—
Rangoon	1,200	1,200
Singapore	1,560	1,560
Suez (N.E. monsoon)	3,440	3,440
„ (S.W. monsoon)	4,360	3,785
Trincomalie	265	265

INDIAN OCEAN—*continued.*

	Distance traversed by Vessels with Auxiliary Steam-power.	Distance traversed by Full-powered Steam Vessels.
From MADRAS *to*	Miles.	Miles.
Bombay (N.E. monsoon)	1,480	1,480
„ (S.W. monsoon)	4,320	1,480
Calcutta	750	750
C. of Good Hope (N.E. monsoon)	4,960	4,960
„ (S.W. monsoon)	5,520	5,160
From CALCUTTA *to*		
Bombay	—	2,120
„ (N.E. monsoon)	2,120	—
„ (S.W. monsoon)	4,900	—
C. of Good Hope (N.E. monsoon)	5,700	5,580
„ (S.W. monsoon)	6,600	5,780
Mauritius:		
„ (N.E. monsoon)	3,240	3,240
„ (S.W. monsoon)	4,260	3,440
Point de Galle (Ceylon):		
(N.E. monsoon)	1,140	1,140
Singapore	1,630	1,630
From SINGAPORE* *to*		
Aden (N.E. monsoon)	3,690	3,690
„ (S.W. monsoon)	4,640	3,990
Bombay (N.E. monsoon)	2,460	2,460
„ (S.W. monsoon)	4,650	2,650
Cape of Good Hope	5,560	5,560
Madras (N.E. monsoon)	1,530	1,530
Melbourne	—	3,730
„ (N.W. monsoon)	4,800	—
„ (S.E. monsoon)	5,100	—
Colombo (N.E. monsoon)	1,560	1,560
„ (S.W. monsoon)	2,950	1,560
Rangoon	1,140	1,140
Sunda Strait	500	500
Sydney (S.E. monsoon)	5,650	3,890
From BATAVIA *to*		
Aden	—	3,750
„ (N.E. monsoon)	4,190	—
„ (S.W. monsoon)	4,090	—
From CAPE OF GOOD HOPE *to*		
Aden	—	4,100
„ (N.E. monsoon)	5,670	—
„ (S.W. monsoon)	4,480	—
Algoa Bay	400	390
Bombay	—	4,530
„ (N.E. monsoon)	5,920	—
„ (S.W. monsoon, Eastern passage)	5,640	—
Calcutta	—	5,580
„ (N.E. monsoon)	7,000	—
„ (S.W. mon., E. passage)	6,390	—
Colombo	5,170	4,310
Hobart	6,160	6,160*
Madras	—	4,960
„ (N.E. monsoon)	7,000	—
„ (S.W. mon., E. passage)	5,660	—

	Distance traversed by Vessels with Auxiliary Steam-power.	Distance traversed by Full-powered Steam Vessels.
From CAPE OF GOOD HOPE *to*	Miles.	Miles.
Mauritius	3,080	2,220
Melbourne	6,090	6,030†
Natal	1,060	810
Perth (Swan river)	4,900	4,900†
Singapore	6,370	5,600
Sunda Strait	5,870	5,010
Sydney	6,790	6,500†
Wellington (New Zealand)	7,420	7,070†
Zanzibar (Oct.–March)	3,930	2,400
„ (March–Oct.)	2,460	2,460
From NATAL *to*		
Mauritius	2,400	1,450
From ZANZIBAR *to*		
Aden	—	1,720
„ (N.E. monsoon)	3,130	—
„ (S.W. monsoon)	1,720	—
Bombay	—	2,520
„ (N.E. monsoon)	2,520	—
„ (S.W. monsoon)	2,590	—
Cape of Good Hope	—	2,400
Delagoa Bay	—	1,380
Mauritius	—	1,340
Mozambique	—	570
Natal	—	1,590
Seychelle Islands	1,560	1,000
Tamatave	1,130	1,130
From MAURITIUS *to*		
Aden	—	2,340
„ (N.E. monsoon)	2,600	—
„ (S.W. monsoon)	2,340	—
Bombay	—	2,530
„ (N.E. monsoon)	2,940	—
„ (S.W. monsoon)	2,560	—
Calcutta	—	3,320
„ (N.E. monsoon)	4,290	—
„ (S.W. monsoon)	3,320	—
Cape of Good Hope	2,340	2,270
King George Sound	—	3,300
Natal	1,450	1,530
Colombo	—	2,100
„ (N.E. monsoon)	3,270	—
„ (S.W. monsoon)	2,100	—
From KING GEORGE SOUND *to*		
Adelaide	1,040	1,040
Cossack	1,180	1,180
Fremantle	330	330
Hobart	1,500	1,500
Mauritius	3,510	3,510
Melbourne	1,350	1,350
From MELBOURNE *to*		
Aden (Dec.–Mar.)	6,440	6,440
Cape of Good Hope (Dec.–Mar.)	6,930	6,930
Mauritius	4,500	4,200

* *See* also Pacific Ocean.

† On the route recommended by the Admiralty.

PACIFIC OCEAN.

From MAGELLAN STRAIT (E. entrance) *to*		
W. entrance (Cape Pillar)	—	310
From MAGELLAN STRAIT (W. entrance) *to*		
Esquimalt (Vancouver Island)	8,430	7,060
San Francisco	7,800	6,300
Valparaiso	1,500	—
„ (Smyth Channel)	—	1,270

From VALPARAISO *to*		
Callao	1,290	1,290
Coquimbo	190	190
Esquimalt (Vancouver Island)	7,350	5,860
Honolulu	6,030	5,880
Mazatlan	4,100	4,100
Panama	2,610	2,610
San Francisco	6,700	5,120
Tahiti	4,760	4,210

PACIFIC OCEAN—*continued.*

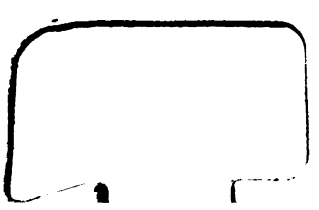
	Distance traversed by Vessels with Auxiliary Steam-power.	Distance traversed by Full-powered Steam Vessels.
From CALLAO *to*	Miles.	Miles.
Coquimbo	2,000	1,100
Esquimalt (Vancouver Island)	6,640	4,780
Honolulu	5,300	5,120
Mazatlan	2,730	2,730
Panama	1,320	1,320
Payta	490	490
San Francisco	5,940	3,930
Tahiti	4,200	4,260
Valparaiso	2,000	1,290
From PANAMA *to*		
Acapulco	1,410	1,410
Callao	4,620	1,320
Esquimalt (Vancouver Island)	4,580	4,000
Honolulu	5,100	4,640
Mazatlan	2,040	2,040
Payta	880	850
San Francisco	3,980	3,140
Sydney	8,000	8,000
Tahiti	4,480	4,490
Valparaiso	4,320	2,610
Wellington (New Zealand)	6,790	6,500
From ACAPULCO *to*		
Fonseca Gulf entrance	760	760
Mazatlan	660	660
Nicoya Gulf entrance	1,020	1,020
Panama	1,410	1,410
From MAZATLAN *to*		
Esquimalt (Vancouver Island)	2,860	2,080
Guaymas	390	390
From SAN FRANCISCO *to*		
Acapulco	1,880	1,880
Cape Horn	7,520	6,300
Esquimalt (Vancouver Island)	700	700
Fiji Islands (Kandavu)	4,740	4,740
Honolulu	2,080	2,080
Mazatlan	1,420	1,350
Panama	3,300	3,140
Valparaiso	7,400	5,120
From ESQUIMALT (Vancouver Island) *to*		
Acapulco	2,620	2,620
Callao	7,480	4,780
Cape Horn	7,510	7,060
Honolulu	2,460	2,460
Magellan Strait (W. entrance)	7,210	6,790
Mazatlan	2,160	2,160
Panama	3,840	3,840
Valparaiso	8,100	5,860
From HONOLULU *to*		
Esquimalt (Vancouver Island)	2,540	2,360
Fiji Islands (Kandavu)	2,780	2,780
Hong Kong (N.E. monsoon)	4,950	4,950
Petropaulski	3,450	2,820
San Francisco	2,490	2,080
Sydney	4,490	4,380
Tahiti	2,360	2,360
Valparaiso	7,360	6,060
Yokohama	—	3,440
„ (Apr.–Dec.)	3,600	—
„ (Dec.–Apr.)	4,350	—
From PETROPAULSKI *to*		
Esquimalt (Vancouver Island)	3,000	3,000
Honolulu	2,820	2,820
From YOKOHAMA *to*		
Esquimalt (Vancouver Island)	4,220	4,220
Hong Kong	—	1,560

	Distance traversed by Vessels with Auxiliary Steam-power.	Distance traversed by Full-powered Steam Vessels.
From YOKOHAMA *to*	Miles.	Miles.
Hong Kong (N.E. monsoon)	1,710	—
„ (S.W. monsoon)	2,530	—
San Francisco	4,530	4,500
From SHANGHAI *to*		
Singapore	—	2,200
„ (N.E. monsoon)	2,200	—
„ (S.W. monsoon)	2,350	—
Yokohama	980	980
From HONG KONG *to*		
Amur river	—	2,400
„ (N.E. monsoon)	2,600	—
„ (S.W. monsoon)	2,400	—
Shanghai	—	810
„ (N.E. monsoon)	1,000	—
„ (S.W. monsoon)	810	—
Singapore	—	1,440
„ (N.E. monsoon)	1,440	—
„ (S.W. monsoon)	1,600	—
Sydney	—	4,400
„ (W. of Australia)	6,570	—
„ (E. of Australia)	4,400	—
Vladivostock	—	1,680
„ (N.E. monsoon)	1,800	—
„ (S.W. monsoon)	1,680	—
Yokohama	1,560	1,560
From SINGAPORE *to*		
Hong Kong	—	1,440
„ (N.E. monsoon)	1,930	—
„ (S.W. monsoon)	1,440	—
Shanghai	—	2,200
„ (N.E. monsoon)	2,460	—
„ (S.W. monsoon)	2,200	—
Sunda Strait	500	500
Sydney (E. of Australia)	4,300	4,300
„ (W. of Australia)	5,130	—
Yokohama	—	2,870
„ (N.E. monsoon)	3,200	—
„ (S.W. monsoon)	3,000	—
From TAHITI *to*		
Honolulu	2,530	2,360
Sydney	3,400	3,050
Valparaiso	4,960	4,210
Wellington (New Zealand)	2,630	2,340
From SYDNEY *to*		
Auckland (New Zealand)	1,260	1,260
Cape Horn	5,850	5,750
Fiji Islands	1,920	1,710
Hong Kong	—	4,130
„ (Eastern passage)	4,950	—
„ (Torres Strait)	4,400	—
Melbourne	570	570
Torres Strait (inside barrier reef)	1,740	1,740
„ (outer passage)	2,160	—
Valparaiso	6,280	6,280
Wellington (New Zealand)	1,200	1,200
Yokohama (Eastern passage)	4,950	4,320
From MELBOURNE *to*		
Adelaide	510	510
Cape Horn	5,860	5,860
King George's Sound	—	1,350
Sydney	—	570
Wellington (New Zealand)	1,470	1,470
From AUCKLAND *to*		
Fiji Islands (Kandavu)	1,080	1,100
Sydney	1,260	1,260
Thursday Island	2,560	2,560

General Passages.

Ports.	By Cape of Good Hope.					By Suez Canal.		
	Full-Powered Steamships.	Auxiliary Steam N.E. Monsoon.	Auxiliary Steam S.W. Monsoon.	Sail Alone N.E. Monsoon.	Sail Alone S.W. Monsoon.	Auxiliary Steam N.E. Monsoon	Auxiliary Steam S.W. Monsoon.	Full-Powered Steamships.
Plymouth to Bombay .	10,450	12,320	11,470	13,370	12,520	6,250	6,000	6,000
„ Colombo .	10,150	11,380	11,380	12,430	12,320	6,490	6,490	6,490
„ Calcutta .	11,380	13,360	12,790	14,450	13,840	8,340	7,710	7,710
„ Singapore .	11,350	12,500	12,770	13,550	13,820	8,050	8,050	8,050
„ Hongkong .	12,790	14,400	14,210	15,490	15,260	9,990	9,490	9,490
„ Shanghai .	13,540	15,210	15,020	16,570	16,070	10,800	10,290	10,240
„ Yokohama .	14,220	16,100	15,770	16,960	16,820	11,700	11,040	10,920
„ Melbourne .	11,870	12,490	12,490	13,540	13,540	12,910	12,890	10,670
„ Sydney .	12,340	12,960	12,960	14,010	14,010	12,360	12,340	11,200
„ Wellington .	12,910	13,890	13,890	14,940	14,940	13,560	13,540	12,110

Ports.	By Magellan Strait.		By C. Horn.
	Full-Powered Steamships.	Auxiliary Steam vessels.	Sail.
Melbourne to Plymouth . .	13,090	13,820	14,160
Sydney „ . .	12,910	13,750	14,150
Wellington „ . .	11,710	12,550	12,950
Valparaiso „ . .	8,560	9,380	9,800
San Francisco „ . .	13,300	15,370	15,820
Esquimalt „ . .	14,050	16,030	16,460
Honolulu „ . .	13,410	14,870	15,370
Plymouth to Valparaiso . .	8,560	8,830	9,120
„ San Francisco .	13,300	15,050	15,360
„ Esquimalt . .	14,130	15,680	15,990
„ Honolulu . .	13,410	14,350	15,180

THE END.

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